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ABSTRACT

In the 1998 Amendments to the Higher Education Act, Congress directed the National Center for Education Statistics to conduct a new study of higher education costs paid by institutions and prices paid by students and their families. This report contains commissioned papers prepared in support of this study and a summary of a meeting convened to discuss these papers. The papers are: (1) "An Essay on College Costs" (David W. Breneman); (2) "Higher Education and Those 'Out of Control Costs'" (D. Bruce Johnstone); (3) "Cost Analysis and the Formulation of Public Policy" (Dennis P. Jones); (4) "Institutional Financial Health: Tuition Discounting and Enrollment Management" (Lucie Lapovsky); (5) "Issues of Cost and Price in Higher Education: Observations on Needed Data and Research" (Michael McPherson and Morton Owen Schapiro); (6) "Measuring Higher Education Costs: Considerations and Cautions" (Michael F. Middaugh); and (7) "Higher Education's Costs, Prices, and Subsidies: Some Economic Facts and Fundamentals" (Gordon C. Winston). Each paper contains references. (Contains 17 tables and 9 figures.) (SLD)

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NATIONAL CENTER FOR EDUCATION STATISTICS

Statistical Analysis Report **December 2001**

Postsecondary Education Descriptive Analysis Reports

Study of College Costs and Prices, 1988–89 to 1997–98

Volume 2: Commissioned Papers

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NATIONAL CENTER FOR EDUCATION STATISTICS

Statistical Analysis Report December 2001

Postsecondary Education Descriptive Analysis Reports

Study of College Costs and Prices, 1988–89 to 1997–98

Volume 2: Commissioned Papers

Alisa F. Cunningham
Jane V. Wellman
Melissa E. Clinedinst
Jamie P. Merisotis
The Institute for Higher Education Policy

C. Dennis Carroll
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U.S. Department of Education
Office of Educational Research and Improvement NCES 2002–158

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Agenda for National Invitational Meeting

AGENDA

NATIONAL INVITATIONAL MEETING ON COLLEGE COSTS AND PRICES
Co-Sponsored by
National Center for Education Statistics (NCES) and
National Postsecondary Education Cooperative (NPEC)
August 2-3, 2000

Marriott Washington
Washington, DC 20037

Wednesday, August 2

8:30 a.m. – 9:00 a.m.	Continental Breakfast
9:00 a.m. – 9:15 a.m.	Introductions and Welcome, Review of the Purpose of the Meeting – Dennis Carroll, NCES
9:15 a.m. – 10:30 a.m.	Overview of the Topic – Jane Wellman, The Institute for Higher Education Policy

- Economic Trends Affecting Higher Education Finance – The Last 25 Years
- Public Perceptions of College Prices and Costs
- Research on Trends in Prices and Costs
- Analysis and Conclusions from the Cost Commission
- Cost and Price Drivers – What the research shows about patterns between publics and privates

10:30 a.m. – 10:45 a.m.	Break
10: 45 a.m. – noon	Presentation and discussion of Commissioned Papers

(Note: Not all of the authors are able to attend the meeting. Jane Wellman will summarize the major findings of papers from authors who are unable to attend.)

- David W. Breneman, Dean, Curry School of Education, University of Virginia, "An Essay on College Costs";
- D. Bruce Johnstone, Professor of Higher and Comparative Education, SUNY Buffalo, "Higher Education and Those 'Out of Control Costs'";
- Dennis Jones, President, National Center for Higher Education Management Systems (NCHEMS), "Cost Analysis and the Formulation of Public Policy";
- Lucie Lapovsky, President, Mercy College, New York, "Institutional Financial Health: Tuition Discounting and Enrollment Management";
- Michael McPherson, President, Macalester College, and Morton Owen Schapiro, President, Williams College, "Issues of Cost and Price in Higher Education: Observations on Needed Data and Research";

- Michael F. Middaugh, Assistant Vice President for Institutional Research, University of Delaware, "Measuring Higher Education Costs: Considerations and Cautions"; and
- Gordon C. Winston, Professor of Economics and Director of the Williams Project on the Economics of Higher Education, Williams College, "Higher Education's Costs, Prices, and Subsidies: Some Economic Facts and Fundamentals."

Noon – 1:15 p.m.	Lunch
1:15 p.m. – 4:30 p.m.	Continuation of discussion of Commissioned Papers
4:30 p.m.	Adjourn for the day

Thursday, August 3, 2000

8:30 a.m.	Continental Breakfast
9:00 a.m. – 12:00 p.m.	Matching Problems with Solutions: Researchable Questions

- What are the issues that should be the focus of a study on college costs and prices?
- What models should be used to study the questions?
- Aiming the study: national data versus samples
- Time horizon needed to study costs and prices?
- Data sources and limitations
- Other issues

12:00 p.m. Adjournment

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Commissioned Papers

An Essay on College Costs

David W. Breneman
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My Approach to This Topic

My involvement with the research issue of college costs goes back over 30 years to my graduate school days in economics at the University of California at Berkeley. My dissertation was conducted under a Ford Foundation grant designed to attract economists and other quantitative social scientists to the study of higher education. At that time, use of computers for simulation studies was the hot new item, and several of us worked on aspects of computer simulation of activity (and cost) flows within the university. These exercises were more for the use of management than for public policy understanding, and while they had some value, I think it is a fair judgment to say that the lasting impact has been small, for two main reasons—the assumption of linear production and the problem of joint products.[1]

The assumption that university production is linear, i.e., to double output one must double input, proved unreliable in the absence of well-defined output measures, but the key conceptual problem with these models was the inherent jointness of production within the university, where undergraduate education, graduate education, research, and public service were often mixed together in ways that made meaningful cost identification impossible.[2] How one chose to allocate costs among these joint products was essentially arbitrary, and one could generate wildly different cost estimates for the parts, based on that allocation. The profundity of this problem was sufficiently persuasive that I ceased to view internal cost analysis as a worthy economic topic, although its application often served internal political purposes.

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[1]Dennis Jones also notes that this early work on costing had limited impact because the results did not connect to the ways people made decisions. The end product—costs/SCH—was less important than the intermediate product—how people were assigned and spent their time—but this latter information was generally not available in these simulation models.

[2]The textbook example of joint production is wool and mutton, both products of sheep raising. It makes no sense to ask how much it costs to produce wool—or mutton—separately, because they cannot be produced separately—they are joint products of sheep production. Any allocation of the costs of sheep production to wool or mutton alone is necessarily arbitrary. While undergraduate education, graduate education, and research are not precisely analogous to the wool and mutton case, in that they can be separately produced, in practice they are jointly produced within universities, and thus suffer similar problems of cost allocation.

Shortly after I graduated from Berkeley, the Education Amendments of 1972 were enacted, including a call for a National Commission on the Financing of Postsecondary Education to review certain questions that had arisen during the legislative debates.

Among these questions was a Congressional request for the definition and measurement of "national uniform college costs." The commission published a respectable report (National Commission on the Financing of Postsecondary Education 1973), but the effort to define and measure "national uniform college costs," whatever that might mean, was not among its achievements. My conclusion at the time, which I have had no reason to change, is that a federal quest to understand or measure college costs essentially represents an ill-defined question for which there is no reasonable or useful answer. Policymakers turn to costs because that seems sensible and tough-minded, but no branch of the federal government could cope with the mountains of detailed cost data that any such effort would produce. A more productive approach to the underlying concern about resource allocation would entail trying to understand the nature of competition within the market for higher education, the incentives produced by various forms of student aid, the nature of market failure, if any, and the fundamental nature of educational production. Setting loose hundreds of accountants to prowl through the books of colleges and universities in search of college costs would be a horrid waste of time and talent. In the balance of this paper, my remarks will focus on those matters that I believe can be studied usefully.

Theories of College Cost

While buckets of ink have been spilled in commentary on college costs, only two basic theories have been put forth that warrant consideration. The first, advanced in the 1960s by economists William Baumol and William Bowen, argues that higher education belongs to a class of activities that is not capable of experiencing productivity increase, but still has to pay competitive salaries that rise over time. The combination of rising salaries and no productivity gain yields a steady increase in the unit cost of education, a problem shared with other handicraft activities such as the performing arts, medical care, and high quality restaurant meals. Adherents to this view argue that we should quit worrying about the inexorable rise in college costs, accepting that as a technical fact of economic life. Instead, we should celebrate the fact that many sectors of the economy do experience productivity growth, thereby releasing resources over time to those sectors, such as education, which do not. A candid observer of political behavior would have to admit that this conclusion has not proved convincing to most policymakers, although the argument may indeed be accurate.

A second theory, put forth in the late 1970s by economist Howard Bowen, is known as the revenue theory of cost. After a lifetime in higher education, as faculty member and president of

both private and public colleges and universities, Bowen concluded that institutions of higher education raise all the money that they can, and spend it on worthwhile activities. This observation may appear at first glance to be tautological, but if true, it does have meaningful implications. For one thing, the only way to limit cost increase is to limit revenues, and for another, it suggests that there is no objective standard regarding how much college should cost. Institutions index every financial variable to the outlays of a peer group, and judge themselves by where they fall in that relative ordering, always striving to increase their standing. Gordon Winston (2000) has elaborated on this view in his essay, "The Positional Arms Race in Higher Education." In that essay, he focuses on a stylized model of student selection and institutional ranking, using his measure of subsidy per student as the ranking device for colleges, and SAT scores as a proxy for student quality. I will comment later on his measure of subsidy, for it relates closely to the issue of this paper, but for the moment it is worth pointing out that his approach is an elaboration and refinement of the basic insight expressed by Howard Bowen years before. In a sense, Winston's paper develops the logical conclusions of a set of revenue-maximizing institutions, cast into competition for students of the highest quality. One of Winston's conclusions directly relevant to this topic is that competition produces an emphasis on enhanced college quality, rather than on price competition *per se*. In that sense, his paper explores the determinants of college costs through an analysis of the competitive market for higher education, one of the approaches recommended above.

Beyond these two theories, the balance of the work done on college costs is non-theoretical and directly empirical, often resulting in a laundry list of contributing factors. A prime example would be the recent report of the National Commission on the Cost of Higher Education (1998). The Commission concluded that one could identify six categories of "cost drivers": (1) financial aid, (2) people, (3) facilities, (4) technology, (5) regulations, and (6) expectations. An admirable list, but not terribly helpful. Similarly, economist Charles Clotfelter (1996) studied in painstaking detail the cost structures over time of four private institutions; Harvard, Chicago, Duke, and Carleton College, and documented a general quality enhancement as the main explanation for rising costs. While both of these efforts have added nuance and insight into aspects of the college cost issue, neither has provided policymakers with much traction on ways to influence this market.

One important point has been raised most effectively by Gordon Winston, in a series of papers, including one prepared for the Cost Commission (1998). Winston has argued that our approach to this topic is influenced wrongly by an analogy to the profit-making firm, where price exceeds cost by an amount that equals profit. In the non-profit sector, and particularly in higher education, Winston argues that cost exceeds price by an amount equal to subsidy. For colleges and universities, this "subsidy" is made up of all non-tuition sources of revenue, including state

appropriations, federal grants and contracts, federal, state, and private financial aid to students, endowment earnings, annual gifts, auxiliary revenues, and so forth. Our language often confuses the discussion, because when the public rails against increases in college costs, more precisely they are railing against increase in college prices. At a time when the shares of college revenues are shifting, as they have been in the last two decades, the result may be confusion between a shift in the burden vs. an increase in economic cost. A simple example will help. Suppose a state university receives $12,000 per student in appropriations, and charges $4,000 in tuition; assuming that all revenue goes toward education, then the student pays 25 percent of a $16,000 educational cost. Now suppose that the state reduces its appropriation to $10,000 per student, and the university responds by raising tuition to $6,000. From the student and family's point of view, "costs" have risen by 50 percent, but the true economic cost has remained unchanged. To some degree, this simple model explains much of what has happened in the public sector in recent years.[3] To that extent, public universities are caught in a public relations trap, for the public rarely sees or understands the cuts in appropriations, but they quickly see and respond to the resulting tuition increases. State politicians often respond, not by explaining the shift in support from the general taxpayer to the student, but by castigating the universities for their profligate ways.

The Need to Examine Public and Private Sectors Separately

The forces operating on both costs and prices in the public and private (non-profit) sectors differ, and the two sectors require distinct analysis. In the public sector, tuition charges are politically determined prices that often bear little, if any, direct relationship to economic costs. State officials determine how the cost of higher education should be divided among students and the general taxpayer. As noted above, there has been a steady shift for the last 20 years away from the taxpayer and toward the student. An additional complication is the distinction between in- and out-of-state tuition, and also between undergraduate and graduate/professional student charges. Political sensitivity is typically strongest regarding in-state, undergraduate tuition, while out-of-state charges are often set at or above some measure of cost. The main point, however, is that student charges at public institutions, enrolling nearly 80 percent of those attending, are determined by political decisions, while economic costs in the public sector reflect the sum of appropriations plus tuition, plus the capacity of each institution to raise other, non-tuition sources of funds. (Note here how Howard Bowen's revenue theory of costs can be given empirical meaning.)

[3]See McPherson and Schapiro (1998), Tables 3.1 and 3.2, pp. 26-27. In 1979-80, tuition accounted for 15 percent of public institution revenue, state support for 62 percent; in 1992-93, these shares had changed to 24 and 53 percent, respectively.

In the private sector, state policies and programs have less influence, and the market becomes the principal arbiter of prices charged. But the private sector is far from monolithic in its financial circumstances. The majority of private colleges and universities struggle to make ends meet, and in some cases, to survive. Many of them discount their stated tuition deeply, 40 percent or more, so that the net price a student pays is much less than the posted price. In recent years, a few private colleges have cut tuition, and others have frozen it, but in most cases, a three to five percent increase in tuition will be eaten up to a significant degree by increased student aid discounts. It is hard to see how any external, political attempt to constrain their (increasingly meaningless) posted prices would do anything but tip some of these colleges into bankruptcy.

This brings us to that tiny set of private colleges and universities, probably no more than 50 or so, that have enormous wealth and large applicant pools. Endowments are very unequally distributed among colleges and universities, and those with the most to start with have experienced phenomenal gains in the run-up of the stock market in the 1990s. Indeed, the recent behavior of these select institutions forces one to modify the revenue theory of costs in two ways. These colleges and universities do not raise all that they can, and they do not spend it all. The first point follows from their huge applicant pools, suggesting that they could actually increase tuition faster than they have and still fill up with excellent students. (One suspects that negative public relations is the main deterrent to their charging what the market would bear.) The second follows from endowment increases that exceed the payout rate for operations by an amount significantly greater than inflation, hence leading to increased saving. These are the colleges, by the way, that generate the most media attention, and which are the source of much of the grumbling and concern about rising college costs. On a purely political level, anything that could be done to slow the rate of increase among these highly selective institutions would ease the public relations problem, but this is not likely to happen through individual institutional behavior.[4] Winston's analysis of the "positional arms race" discussed earlier is relevant to understanding the competitive behavior of these institutions, and indicates just how difficult are the strategic problems faced by each institution.

Related Topics Worth Pursuing

If setting loose hundreds of cost accountants is not the way to make progress in this area, what is? Recent literature reveals several puzzles and disagreements that, if resolved, might move the discussion forward. I discuss two of these issues briefly, and conclude with a broader

[4]See Breneman (2000) for a discussion of the likely failure of Williams College to slow the rate of tuition increase within this sector.

set of questions that are ultimately more fundamental to the policy issues involved in higher education finance.[5]

Are Price Increases Really that Serious?

In testimony before the U.S. Senate Committee on Governmental Affairs, February 9, 2000, economist Caroline Hoxby presented statistical evidence suggesting that the increase in college prices has been vastly exaggerated. She argues that tuition has only risen (in real terms) in the most expensive 20 percent of college places, and that such increases are warranted for the highly qualified students who need what she calls "high intensity" college work.

She essentially sees little, if any, evidence of market failure, and argues that access has improved over time for all potential college students, regardless of ability or income. Reading her testimony in conjunction with the recent books by Tom Kane, and by McPherson and Schapiro, noted in an earlier footnote, provides a definite contrast, for the latter authors are very concerned about differing rates of attendance by income levels and minority status. Reconciling these two divergent views about the performance of our educational system would be a valuable contribution to this subject.

Is Winston's Subsidy Really a Student Subsidy?

Earlier I noted the analytical use Gordon Winston has made of his ranking of colleges and universities by the level of student subsidy, derived from analysis of the IPEDS financial reports to NCES (Winston, 2000). In January 2000, approximately 20 economists who work in this field gathered in New York for a day's discussion of Winston's work and contrasting work done by Robert Zemsky and William Massy (Winston 1998; Zemsky et al. 1999). Among the issues in dispute is whether it is accurate to assume that the subsidy that Winston calculates is a resource enjoyed by (undergraduate) students, as his paper implies. The counter argument is that this "surplus" is actually captured by the faculty, at least in research institutions, who use it for research and for graduate students. This debate obviously connects with the argument about joint production, mentioned early in this paper, and to the issue, not heretofore discussed, of cross-subsidization of activities within the university.

In varying ways, each of these controversial issues is embroiled in the debate over college costs. If Winston is correct, for example, in his assumption that undergraduate students receive in educational services the value of what he computes as the subsidy, then criticism of higher education's behavior is muted. If, however, much of that "subsidy" is re-directed to faculty and

[5]This section benefited from comments by Sarah Turner and Jane Wellman.

graduate student use, then policymakers may have more reason to be concerned. In part, Winston has tilted the argument in his favor by using the term "subsidy" for what one might have called, more neutrally, "non-tuition revenue." Expressed in that way, one might be inclined to look for uses other than undergraduate education on which the money may be spent. After four hours of discussion on that January day, however, these difficult conceptual and empirical issues were not resolved. Further work on these matters is clearly warranted.

How Significant Are Market Failures in Higher Education?

As noted earlier, Hoxby has argued that market failures in higher education are minimal. The conventional list of such failures includes: credit constraints, imperfect capital markets, externalities, and information problems facing students. In addition, higher education clearly plays a central role in the intergenerational distribution of income, which provides a further rationale for public policy attention. It is surely reasonable to revisit each of these reasons for public support of higher education, to ascertain the degree to which they are still valid concerns.

Externalities and Optimal Funding Patterns

An efficient balance of federal versus state subsidy should rest on the degree to which spillover effects (externalities) are localized, or move with the student. To the extent they are localized, state funding makes more sense, but if the educated populace is increasingly mobile, a case can be made for a greater federal share in whatever subsidy is provided. In light of the changing economy, these questions might be usefully investigated as a guide to both state and federal policymakers.

What Are the Implications of New Providers?

As each of these last questions suggests, there is reason to revisit a number of older rationales for public support of higher education. A new factor is the emergence of for-profit providers (e.g., the University of Phoenix), and the growth of on-line learning capabilities provided by new electronic technologies. While higher education has rarely substituted capital for labor in its production methods, that possibility now exists, and both traditional and new providers are exploring the possibilities. While the emerging nature of higher education supply is not yet clear, discussions of finance should be incorporating these new realities. Understanding the economics of new production techniques, and getting the incentives right, have great potential for changing the discussion of rising college costs, and research on these issues should have a high payoff.

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Higher Education and Those "Out of Control Costs"

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To hear most politicians, journalists, businesspersons, and parents, the costs of college are "out of control." Variations on this theme include allegations that higher education "is the next health care industry," or that "these (tuition) increases just can't keep going up," or that the professors and the presidents "just don't get it." The last remark conveys a notion that the (presumably excessive) cost and/or price increases in colleges and universities are not really necessary, but reveal some combination of greed, selfishness, and incompetence. This view is not the exclusive province of "outsiders" in the media or politicians; many analysts within the academy seem to share the view that costs are excessive and can be controlled. Leslie and Rhodes (1995) talk about "internally pathological" cost increases; Massy (1991, 1996) describes the "administrative lattice," the "accretion of unnecessary tasks" and "output creep;" Gumport and Pusser (1995) use the term "additive explanation" for growth in internally-driven tasks unrelated to the organization's product; and Zemsky et al. (1999) write of faculty-driven "margins" for the benefit of "name-brand" faculty.

At the same time, faculty and administrators of many colleges and universities feel as though they have been living amid almost perpetual financial challenges, constantly cutting, reallocating, downsizing, outsourcing, and chasing new revenues. More than a few institutions have cut costs so deeply they have lost many of their full-time faculty—and arguably a good deal of their former quality. Many colleges have also changed profoundly—as the example of a residential Roman Catholic liberal arts college for young women transforming itself into a secular, co-educational college for part time adults seeking career education in business or the health professions illustrates. Entire public systems have lost real resources (mainly fulltime faculty and support staff) as well as the ability to maintain library and equipment purchases, even as they have invested in new fields and new technologies.

[1]This paper is excerpted from a chapter of the same title appearing in Altbach, Johnstone, and Gumport (2001).

Also at the same time, students and parents are increasingly clamoring to get into the highest-priced colleges and universities, the principal signal—for those who believe in markets—of the *worth* of those colleges and universities. Finally, in spite of tuition increases, it can still be said that any student who is of traditional college-age, who is at all academically able, and who is willing to borrow and/or work part time can probably get into several colleges or universities regardless of the financial status of his or her family.

Why such a disconnection? How can it be that the American public, along with many scholars and "insiders," believe that higher education costs are "out of control," or at least greatly excessive, while most faculty and many administrators believe that their part of the enterprise is woefully underfunded, efficient to the point of compromising academic values, and working them harder than ever? This paper examines higher education costs, prices, and some of the criticism surrounding American colleges and universities in search of an explanation of this apparent disconnection, and some answer to the question of "how like a business" the American public can expect its universities to be.[2]

The Several Meanings of "College Cost" and Trends in Costs and Prices

There are basically four ways to analyze college costs: the production cost, tuition, total expense costs, and net or discounted costs. The perspective on cost trends in higher education shifts dramatically depending on the measure used and the sector examined.

Production Cost, or Cost of Instruction

Production costs are the underlying costs of instruction: a function of faculty-student and staff-student ratios, average salaries and benefits (which are partly a function of the ratio of regular full-time, to adjunct or other part-time, staff), and other operating and capital costs attributable to undergraduate instruction. The real variance in per-student production costs among institutions is very great. Undergraduates in the United States can be taught at very low cost—especially if the faculty are paid very little, go largely without benefits, are given heavy teaching loads, are absolved from expectations of research, institutional governance, and academic or community service, and given minimal support in the way of facilities or professional staff. Or,

[2]I write with some bias. Although I have studied, written about, and taught graduate courses on the economics and finance of higher education for more than twenty years, my most vivid lessons in higher educational finance have come from nine years as president of the largest comprehensive college of the State University of New York system and another six years as chancellor of that system, which consists of 29 state-operated institutions, 30 community colleges, and the "contract colleges" of the private universities of Cornell and Alfred. In almost every one of those fifteen years (and frequently more than once in a single fiscal year), I and my administrative team have had to cut faculty, staff, and operating expenses (on more than one occasion extending to the removal of tenured faculty), totaling approximately 20 percent of the full-time faculty and staff of the state-operated system. See Johnstone (1992).

they can be taught at very high cost—if the college has the resources to compete for the best faculty, to support research, and to attract a bright and diverse student body, "purchased," in part, with generous financial aid, abundant library and computing facilities, and a rich array of student activities and other support services (Clotfelter 1996). Table 1, below, from the U.S. Department of Education's National Center for Education Statistics (NCES), using Higher Education General Information Survey (HEGIS) and Institutional Postsecondary Education Data System (IPEDS) data, shows the increase in per-student "educational and general" production costs expenditures in constant 1995–96 dollars. Although the data are limited, it does not seem to support the notion of "out of control" instructional costs.

Table 1.—Per-Student Educational and General Expenditures and Average Annual Rates of Increase by Control and Type: 1977-1995

Constant 1995–96 Dollars

	Public Sector				Private Sector			
	University		Other 4-Year Colleges		University		Other 4-Year Colleges	
Year	E&G Spending Per Student	Average Annual Percent Increase Previous 5 Years	E&G Spending Per Student	Average Annual Percent Increase Previous 5 Years	E&G Spending Per Student	Average Annual Percent Increase Previous 5 Years	E&G Sending Per Student	Average Annual Percent Increase Previous 5 Years
1995–96	$19,700	1.6	$13,403	2.2	$37,200	2.6	$17,177	2.3
1990–91	18,237	1.6	12,102	0.3	32,945	3.5	15,417	2.7
1985–86	16,868	1.9	12,283	1.4	27,983	3.3	13,605	2.9
1980–81	15,391	0.4	11,482	1.0	24,040	1.1	11,876	0.7
1976–77	15,112	**	11,020	**	23,395	**	11,533	**

SOURCE: U.S. Department of Education, National Center for Education Statistics (NCES), 1999, *Condition of Education 1999*, Washington, DC: U.S. Government Printing Office, Supplemental Table 40-2.

Tuition

The second construct of "college cost" is tuition, or that portion of production costs passed on to students and parents as the *sticker* or *nominal price*. This is what the press gets most excited about, and what is unambiguously and rapidly rising. It is tuition—or perhaps even more so the *annual increases* in the "posted," or "sticker," or "nominal" tuition—that is probably at the root of most allegations of "out of control costs." Average annual tuition increases for public and private colleges in unadjusted dollars, as compiled annually by the College Board, increased well over 600 percent in the 25-year period from 1974–75 through 1999–00, with annual tuition increases in the private sector averaging 15 percent in the last half of the 1980s.

Table 2.—Average Tuition and Tuition Increases, Public and Private 4-Year Sectors: 1974–75 to 1999–00

Constant 1999 Dollars

	Public Sector [4 year]		Private Sector [4 year]	
Year	Average Tuition	Average Annual Percent Increase Previous Five Years	Average Tuition	Average Annual Percent Increase Previous Five Years
1999–00	$3,356	2.6	$15,380	3.8
1994–95	2,968	6.7	12,938	2.6
1989–90	2,217	5.1	11,436	9.0
1984–85	1,769	2.4	7,882	2.8
1979–80	1,580	2.8	6,904	0.3
1974–75	1,386	**	6,793	**

SOURCE: College Board, 1999, *Trends in College Pricing*, Washington, DC: College Board, Table 5, p. 7.

Expressing these increases in constant dollars eliminates the misleading and inflammatory effect of general inflation. As shown in Table 2, the average annual *real* (constant 1999 dollars) tuition increases were still quite considerable for the private sector in the last half of the 1980s, averaging nearly 9 percent annually, and in the public sector from the mid 1980s through the mid 1990s, averaging almost 7 percent. Otherwise in this 25-year period, the average annual increases were mainly in the range of 2 to 3 percent, which is expected in an economic sector in which unit cost and price increases reflect essentially the average increases in total compensation—which in turn approximates the average real increase in total economic output.

Total Expenses

A third construction of the costs of higher education is the total package of all parent- and student-borne expenses, including tuition, other fees and costs of student living, including lodg-

ing, food, transportation, and all other expenses. The cost of student living, books, transportation, and other expenses—most or all of which are not under the control of any college or university—vary widely according to whether the student is living at home, in a dormitory or with friends or a partner in an apartment, and according to transportation expenses and the chosen standard of living. Table 3 shows some estimated "other-than-tuition expenses" as percentages of the estimated total expenses for a year in college, according to the College Board. These range from 34 percent of total expenses for a year in residence at an average private college, to 69 percent for a residential experience at a public college, and 62 percent at a public college living at home. In fact, since these College Board numbers are from college-reported averages, the actual range is probably much greater. But the point is that dwelling only on tuition seriously underestimates the expense burden that must be met by parents and students, especially in public, "low tuition" colleges, and even in situations where low public tuition is combined with living at home.

Table 3.—All Other-Than-Tuition Expenses as a Percent of Estimated Total Expenses, College Board National Averages Estimates

	Private Residential	Public Residential	Public Commuting
Tuition and Required Fees	$15,380	$3,356	$3,356
All Other Expenses	8,271	7,553	5,418
Total Expenses	$23,651	$10,909	$8,774
"All Other Expenses" as Percent of Total	34 %	69 %	62 %

SOURCE: College Board, 1999, *Trends in College Pricing*, Washington, DC: College Board, Table 4, p. 6.

Putting a range of these student living and other expenses together not with the published average tuitions, but with modeled, or reasonable estimates of high and low tuitions in both the public and the private sectors, yields the range of possible total expenses for an undergraduate academic year in the United States in 1998–99, shown in Table 4.

Table 4.—Total Costs/Expenses Borne by Students and Families, U.S. Colleges and Universities: 1998–99

	Public		Private	
	High Expense	Low Expense	High Expense	Low Expense
Tuition and Required Fees	$4,000	$1,200	$20,000	$10,000
Other Educational Expenses	850	700	900	900
Room and Board	5,650	1,800	6,600	5,600
Transportation/Other	1,500	2,000	1,500	1,500
Total	12,000	6,000	29,000	18,000

SOURCE: Estimates by author. See D. Bruce Johnstone, 1999, *The High Tuition-High Aid Model of Public Higher Education Finance: The Case Against*, Albany, NY: National Association of System Heads. Office of the SUNY Chancellor, Table 13.4, p. 362 and notes.

The costs illustrated in Table 4 are what most parents have in mind when they give vent to "college cost anxiety;" this is the cost that will drive student indebtedness. Much of this cost, such as room, board, transportation, entertainment, and the costs of books and computers, is outside the control of either the institution or the state or federal government. Moreover, most of these costs at public institutions arguably are not costs of college at all, but merely the costs of young adult living, and would be incurred in or out of school.

Net Expenses

However, the real impact on student and family college-going behavior may be best indicated by yet another construction of college costs, the total costs or expenses borne by students and families *net of financial assistance*. The National Commission's information on total and net price of attendance is shown in Table 5. These data are back to the published averages, rather than the modeled ranges used for Table 4, and as such illuminate very little because the discounts vary greatly according to calculated "family financial need" (or its converse, the calculated "expected family contribution.") These calculations, in turn, depend on current income, certain assets, and other family obligations. But Table 5 does show that:

- Total available financial aid (loans and work study as well as grants) has substantially cushioned the increase in total expenses for public and private four-year colleges
- The greatest percentage increase in college expense net of financial assistance of all kinds has been in the public sector, and especially in community colleges
- The least percentage increase in net expense has been (on average) in the four-year private sector.

Table 5.—Total Costs or Expenses Borne by Student and Family Net of Grants and Total Financial Assistance: 1996

	Average Public 4-Year		Average Public 2-Year		Average Private 4-Year	
	1996	Percent change from 1987	1996	Percent change from 1987	1996	Percent change from 1987
Total Average Expenses Borne by Student and Family	$10,759	109	$6,761	141	$20,0003	84
Total Expenses Minus Grant Aid [Affordability]	9,365	114	6067	159	15,069	81
Total Expenses Minus All Financial Aid [Accessibility]	7,262	95	5717	169	11,205	64

SOURCE: National Commission on the Costs of Higher Education, 1998, *Straight Talk About College Costs and Prices*, Phoenix, AZ: Oryx Press, p. 7.

Table 5 also illustrates the concept of affordability versus accessibility, in which *accessibility* refers to the ability to attend, i.e., come up with the cash, even if only by borrowing; *affordability* refers to the true discounting provided by grant aid and the loan repayment subsidies. The portion of financial assistance in the form of loans has increased dramatically, from 41 percent in 1980–81 to 47 percent in 1992–93, to 58 percent in 1998–99 (College Board 1999). If *access only* is the exclusive object of financial assistance, then loans may be generally sufficient—and under most circumstances, will be more cost effective (to the taxpayer) than grants.[3] But large student indebtedness, aside from providing no real income redistribution, has other possible, or at least alleged, downsides: for example, the claim that some low income and/or minority students are culturally debt averse; or that high indebtedness can distort life plans, such as marriage, or the choice of a socially worthwhile but non-remunerative career.

[3]The cost effectiveness of student loans is a complex matter to determine. In the first place, a student loan is actually a mixture of a student- and/or parental-borne expense (the present discounted value of the amount actually repaid) and an "effective grant," represented by the present value of the stream of public subsidies, including the in-school interest subsidy, any interest subsidy in the repayment stage, and the implicit subsidy of the guarantee, which allows a far lower rate of interest than would be possible for unsecured student borrowing generally. Depending on interest rate, the actual value of money, i.e., the appropriate discount rate, the in-school grace period, losses through default, and the true administrative and servicing costs, student loans can be a great deal less expensive to the taxpayer than an equivalent amount of outright grants.

Out of Control Costs: Variations on the Charge

There are five, rather different charges about costs that have been aimed at higher education's leadership, which broadly defined, include both campus and system CEOs, governing boards, deans and other academic administrators, faculty leaders, and elected officials. The specification or attribution of the charge is important both for understanding cause and for assigning blame—for if there can be no blame, there will likely be no amelioration of the problem.

1. ***Profligacy or Wastefulness:*** the charge that colleges and universities are wasteful: that what they do could be done the same (and in generally the same way, or using the same technology) at much less cost. The charge of profligacy suggests unnecessary and/or overpaid faculty and staff, unnecessary capital expenditures, and insufficient cost controls.
2. ***Wrong Priorities:*** the charge that while cost increases may (or may not) be justified, or at least explainable, colleges and universities are doing too many unimportant or low priority things. The faculty may be busy doing research that is of no interest nor foreseeable consequence to anyone, even to other scholars. Or there may be academic programs, however well-taught, that have few or no students and/or no evidence of actual learning; or a student affairs staff, also hard-working, but with no enthusiastic participants nor evidence of student development.
3. ***Timidity, or the Reluctance to Radically Restructure:*** the charge that there are altogether new (and ultimately less costly) ways of doing things that may require radical alterations of the production process ("restructuring") but that could gain substantial efficiencies if the management were only bolder or more visionary or more forceful.
4. ***Insensitivity to the Student Consumer:*** the charge that, while the costs and especially the cost increases may be justified or explainable, colleges and universities have not made the unusual sacrifices called for by the vulnerability of some of their students (especially those most likely to be dissuaded by tuition increases) and the high stakes of economic and social justice.
5. ***Overselling, or Overenrolling:*** the charge that we have oversold our product; that we are admitting and teaching too many "marginal" students, at public expense and with predictably low odds of success.

In Defense of the Academy's Costs and Prices

Like any multifaceted indictment, there are bits of truth in all of these charges. But overall, the charge that higher educational costs are "out of control," or that tuitions do not reflect value received, is overwrought and mainly wrong. Each of the charges listed above can and should be answered—not to everyone's satisfaction, but in defense of the academy, which has taken more criticism on costs than it deserves.

Are we profligate or wasteful?

The most common defense against this charge is to explain why things in higher education are so expensive and/or why it is so much more difficult than in other sectors to economize due to our general "productivity immunity" or "cost disease." However, a better defense may be simply to dispute the initial observation. As shown in Table 1, the underlying per-student cost, or rate of increase—*where these costs are legitimately a public policy issue, in the tax-supported public sector*—are neither "excessive," nor increasing at excessive rates.

Where most undergraduates are taught—in public community colleges, public comprehensive colleges and universities, and in regional private colleges and universities—salaries have generally lagged behind the general economy, and the ratios of full-time faculty and staff per student in many states have declined (a demonstration of clear cost-side productivity improvement). In private, well-endowed colleges and universities, which are much costlier than their public counterparts to begin with, and becoming increasingly so, there is simply not a legitimate public policy issue as to what their cost or pricing structures should be.

In the public research and doctoral universities, there are undoubtedly pockets of less productive faculty and administrative staff who are working hard at organizational maintenance and at solving very small problems. But this observation yields few specific managerial actions that would demonstrably (and usefully) increase productivity and save public resources. In these public research and doctoral campuses, it is also worth noting that:

- Any reversal of the "drift" of campuses toward the higher-cost end of the per-student cost continuum would almost certainly be opposed, not only by the students, faculty, and alumni, but by governors and legislatures, who have generally been the vanguard of *academic drift*.
- Costs have been lowered substantially already (many would say excessively) through widespread substitution of cheaper part-time and adjunct for full-time faculty.
- Alternative revenues from tuition, fees, research overhead, and aggressive fund-raising have already replaced tax support in many public institutions.
- Public universities have been pursuing standard industry practices such as early retirement, contracting out, decentralized budgeting, electronic transactions and records, online and widely-shared libraries, and aggressive and innovative marketing for decades (and will continue to do so).

It is still necessary to explain why some things continue to cost as much as they do in higher education. For example, many of the supposedly high unit costs have been attributed to externally imposed regulations or mandates. These include: (a) occupational health and safety and similar mandates, especially those affecting research laboratories and academic health cen-

ters; (b) paperwork mandates on offices of admissions and financial aid, where federal regulations are voluminous and ever-changing; and (c) the prohibition against mandatory retirement, which is especially difficult for research universities where much faculty effort is essentially voluntary. While valid, these sorts of restrictions and mandates are no more burdensome than those in many other sectors of the economy, and are probably an insufficient defense against excessive cost.

A similar but more substantial explanation for some high costs in public systems is rigid state finance laws, which exist more to inhibit corruption or outright stealing than to encourage good business practices. For example, as long as state treasurers or comptrollers "sweep" college and university accounts at the end of a fiscal year, returning unspent balances to the state treasury, public institutions will do everything in their power *not* to save, but to spend the money before the end of the year, even to the point of holding excess inventories or making low priority expenditures, in the perfectly rational and even businesslike effort to avoid signaling that they were overfunded to begin with (Johnstone, 1991). Similarly, public colleges and universities in states with executive line item budget control may well overspend on some expenditure categories relative to others simply because that is the way the state finance law is written and the budget is passed; the state budget office is not about to delegate to the campuses the "textbook" optimizing authority to shift expenditures among categories until the benefits per marginal dollar are equalized among categories. Finally, some states may well overspend on wages and benefits relative to the local labor market because the collective bargaining is done by the governor, with the faculty and staff as employees of the state rather than of the public college or university. The institution is then stuck with a compensation agreement to which neither the chief executive officer nor the trustees of the state university were a party. This line of defense does not override the observation that these practices can be wasteful and sometimes profligate. But it ought to blunt the notion of higher education's managerial culpability in the waste.

One of the single most common elements of the profligacy charge is *insufficient faculty productivity*, generally meaning insufficient numbers either of students or courses (or both) per faculty. In response to this charge, however, we must first note that it would have validity almost exclusively at research and doctoral universities, where faculty have low teaching loads for the express purpose of supporting the dominant institutional mission of scholarly productivity. This productivity, in turn, is made possible by holding the teaching time to 40 percent of faculty effort or workload—generally about two formal courses per term, plus undergraduate, graduate, and post-doctoral student advising and mentoring. It may be the case that we have more research and doctoral universities than we need, although insofar as this is a public policy issue, "institutional drift" has only occurred with state gubernatorial and legislative concurrence, and oftentimes, at their initiative. But this is much less a case of inefficient, unproductive, or excessively costly in-

stitutions than it is a case of *inappropriate missions* assigned to some public universities. Finally, it is appropriate to observe that most undergraduate students are being taught in community colleges, small regional private colleges, and public comprehensive colleges (sometimes called universities) where the faculty effort, if anything, is too heavily tilted toward teaching, with insufficient time available for reading and scholarship.

Still, if there were any amelioration of this problem, it would have to be along one or both of two lines. First, some of the least scholarly research or doctoral public universities would have to be closed or converted into comprehensive colleges, with faculty efforts and workloads altered to bring them into accord with the heavier teaching expectations of the public comprehensive colleges. Even if legally, contractually, or politically feasible (which is highly unlikely), the result would be not so much a *less costly institution*, much less a *more productive institution*, but merely a *different institution*—one that is likely to be filled with disgruntled faculty trained, hired, and initially rewarded mainly to be scholars, and now expected mainly to teach undergraduates.

Second, the research and doctoral universities could do a better job of holding faculty accountable for the research and scholarly parts of their jobs, imposing heavier teaching obligations on those who, for whatever reason, have become unproductive in their research. Some faculty would surely protest that such a policy would, or at least could, stifle academic freedom or be carried out with other inappropriate managerial agendas—all of which are valid concerns. More limiting, however, on the capacity of such a policy to substantially enhance higher educational productivity is the likelihood that the volume of good teaching that could be squeezed out of faculty whose research productivity had demonstrably lapsed is almost certainly minimal. (There is also the bothersome asymmetry of such a policy that purports to increase the amount of teaching demanded from the faculty member whose research is deemed insufficient, but no similar determination to increase the research expectations of the faculty member who is an uninspiring or otherwise less than competent teacher.)

The popular assumption that research universities are expensive places to teach undergraduates may be less true than conventionally believed. Research universities have devised ways to hold down the costs of teaching undergraduates which happen to be the very devices that a critical public frequently castigates them: large lectures with graduate assistant recitation sections, or large-scale reliance on adjunct professors for introductory classes. Insofar as there is appropriate criticism at these universities of underlying unit costs, it is more validly a criticism of the *extent of cross subsidization* (of graduate teaching and the underlying scholarly missions of the undergraduate) and of the *inappropriate recruitment and/or placement of undergraduate stu-*

dents in research university settings when they would be better served elsewhere. These may be lapses in effective management, but they are not manifestations of unproductive faculty.

A very different defense is appropriate to the so-called "high end" providers: those private colleges and universities marked by high costs, high tuitions, substantial institutionally provided financial aid, large applicant pools, and considerable selectivity (for example, the colleges and universities making up the Consortium for the Financing of Higher Education, COFHE).[4] This defense is the simple test of the market—that preeminent signal of "worth" in our economy. Yes, these high-priced (and even more, high *cost*) colleges and universities have more faculty, teaching fewer students, with greater support and more physical amenities than seems absolutely necessary to process a given number of students. For all their implicit per-student subsidy via their large endowments, they may still charge more than some families are willing to pay (although a considerable portion of that "cost," as earlier noted, is for room, board, books, entertainment, and other living costs that most of these students would be enjoying anyway). But the major defense is that these families, with plenty of good quality, lower cost alternatives, are lining up to make these sacrifices—including the assumption of substantial student debt—*because they believe the expense to be worth it*. And because there are no public dollars going into this choice (other than need-based financial aid, most or all of which the students would be entitled to at an equivalent public college or university alternative), *there would seem to be no reason for assuming either the underlying unit costs or the tuitions to be a valid public policy issue.*

Do we expend resources for the wrong things?

A slightly but substantively different charge than spending wastefully is spending on the wrong things, or the wrong priorities. This can occur in the allocation or misallocation of resources and efforts among the legitimate, *multiple products* of the university—scholarship, applied versus basic scholarship, teaching (or more accurately, learning), service, service to the community versus service to the discipline, or even service to private causes. Of course, multiple products are not unique to the university. Nor are the other complications such as cross subsidization, or simultaneous production of these different products. What is unique—and what invites the constant barrage of charges of wrong priorities—is the absence of a common, undisputed, easy-to-measure, and unambiguous metric such as contribution to profit. A business only has to apply the single metric of profit to each of its products. A university cannot do this, not because it does not want to or know how to, *but because it cannot be done*. Of course it is possible, albeit exceedingly difficult and probably always contestable, to compare the worth or value of advances in historical scholarship, with the development of a new method of business accounting, with a

[4]And described by Clotfelter (1996).

certain output of baccalaureate graduates, with the advancement of basic science that might lead to application, or with the *learning added* that may be imparted to graduating some at-risk young adults. But it is only possible with something called *academic judgment*, not with some clear and unambiguous common denominator like dollars.

The more serious criticism in the genre of *wrong priorities* is not the priority given one acknowledged product (say, research) over another (such as teaching or learning), however disputed these priorities may be. Rather, it is when resources and attention are expended for what are not end products at all, but for what are clearly intermediary products such as organizational maintenance or stability, solutions to non-problems, or for the aggrandizement of the organization (or worse, of an individual) with no product enhancement. This may be the most valid criticism of college and university management and of excessive costs.

Are we too timid to reallocate radically?

Underlying the charge of timidity is the notion that universities have been managed too much for the benefit and comfort of the faculty and administration, unlike businesses that are, at least in theory, managed for the stockholders, and that do not hesitate to lay off long-time workers, close a factory, move across the Mexican border, or drop and add entire product lines in order to enhance revenue and lower costs.

The criticism of timidity also has some validity. Many (but by no means all) presidents, provosts, and deans are sensitive to, and solicitous of, their faculty in ways that have no counterpart in business or even most other public agencies. This "sensitivity"—correlated with a genuinely influential role of the faculty—is not typical of all colleges and universities. Rather, there is a continuum of "authority sharing," ranging from an authoritarian end, where faculty senates are non-existent or at least non-functional (although there are frequently strong faculty unions) and where the president controls all decision and directs all organizational behavior, to a "collegial" or even "deferential" end, where faculty have very great influence, and even authority, over not only the curriculum and matters of faculty appointments and promotions, but even over the definition and direction of faculty work itself. Proximity to the authoritarian end of this continuum correlates quite directly with low per-student instructional cost; that is, the lower the cost of production (which implies a lean staff, generally low pay, and extensive reliance on part-time and adjunct faculty), the more authority tends to be held by the president and management—and in general the lower the prestige of the faculty and the selectivity of the undergraduate student body. Conversely, the more deference to the faculty, not simply on matters of faculty membership and curriculum, but over the mission and image of the institution and the internal allocation of re-

sources, the higher tend to be per-student costs—and also the greater the faculty and institutional prestige and the selectivity of the student body.

However—and this point is critical—it is not that administrative deference to the faculty causes the higher costs (and tuitions). Rather, it is the abundance of revenue—from endowments, current giving, research overhead, and a strong student market position—that affords the institution the luxury of strong collegial faculty governance and the ability to be deliberative about (or reject altogether) radical change. Conversely, it tends to be the college that is under-endowed, reliant on part-time faculty, unable to be selective in admissions, and dependent upon an ever-changing market niche that generally cannot afford the additional time and occasional wrong decisions associated with shared decision making. In this construction, what may appear to a trustee or a politician or a businessman or businesswoman to be *administrative timidity* is more a purposeful choice of governing style associated with the most prestigious and most successful colleges and universities. It is clearly not a governing style conducive to abruptly changing institutional mission or to forcing a change in the productive behavior of the faculty. Most colleges and universities do not need abrupt alterations in mission, nor can top faculty be attracted to places where presidents, deans, and trustees are trying to direct professional behavior under the rubric of "making them more productive."

This is not to say that many administrators (especially deans and department chairs) of prestigious colleges and universities could not be a great deal more effective in their management roles, at least in part, by becoming more decisive and forceful. Nor is it to claim that some colleges and universities have not suffered, both financially and academically, from presidents who became captive to, rather than leaders of, their faculty. But as a general rule, colleges and universities are "managed" with about as much forcefulness, decisiveness, and even authority—*but no more*—as the nature of the institution, its faculty, and most of all its mission, need at the time.

This defense may beg the question about the alleged need for radical change. For example, the charge of timidity sometimes alleges that most universities are far "behind the wave" of instructional technologies, refusing to recognize that the lecture and even the "seated course" may be mainly obsolete, and that much instruction can take place via the internet, through e-mail, or over fiber. Consultants, pundits, and journalists making such charges tend to be enamored with the "Phoenix Universities" and all other institutions promising to deliver instruction via instructional television, the Internet, or other technologically-aided, essentially self-paced, means. In an earlier published prediction about patterns of finance in the future, the author writes:

> However, most traditional-age undergraduate students engage in higher learning for purposes other than, or at least in addition to, learning: for the prestige of being admitted to a selective institution, for the fun of college life, and for the social learn-

> ing that comes of interacting with fellow students, professors, and other adult professionals. Such students will achieve few if any of these life goals from the Internet or from other forms of self-paced learning.
>
> By this reasoning, radical new patterns of higher education finance predicated on conceivable "out of the box" possibilities presented by the new learning technologies are likely to have a major cost-reducing impact more on firm-specific and continuing professional education, or on personal or recreational forms of postsecondary education, but not on mainstream undergraduate education nor on elite graduate higher education, except when such education is enriched—and made more expensive—as additional resources are brought to it (Johnstone 1998, pp. 254-255).

A final note on the timidity charge: even if the above comments prove to be wrong, and higher education gets overtaken by new providers unimpeded by existing organizational forms and uninhibited by the established norms and values of the academy, this will not prove that the current leadership was wrong in not attempting to radically restructure the colleges and universities of today. In the highly unlikely event of this scenario taking place, the new institutions will almost certainly have to be entirely new ones, or institutions that are forced into radical change not by visionary or exceptionally courageous leadership, but by financial catastrophe.

Are we insensitive to the financial difficulties of our most needy students (or potential students)?

Clearly, higher education, at least as we have become used to it, is a costly enterprise, both in itself (i.e. the production cost) and its price, or tuition, whether or not one wishes to press charges that it is *too* costly. Just as clearly, it is possible for most institutions of higher education to provide instruction (ignoring, for a moment, scholarship and other outputs that are legitimate and important products of many institutions) at less cost per-student, and also, if necessary, to price this instructional product at even less net tuition. It is intuitively likely that there are some, and perhaps many, students who could profit from higher education (and from whose higher education society would also profit) who are dissuaded from college in part because of this expense (tuition less aid), even if other factors, such as poor academic preparation and low interest, also contribute to their failure to pursue a higher education. We also know that these "dissuaded" students are disproportionately from low-income, African-American, Latino, and Native American families, and are older, and even dropouts from high school. And finally, we know that without at least some higher education, the chances of middle class opportunities are greatly diminished.

The critical question to this line of inquiry is whether this disproportionality is so great and so unjust that its diminution—that is, an increase in college participation among these hitherto

underserved populations—must supercede other criteria for the allocation of revenue within higher education, including such conventional criteria as the quality of faculty scholarship and the preferences of the conventional entering students. The "waste" of higher educational resources under this construct is an extreme case of misplaced priorities, in which some would claim that most expenditures (at least in publicly supported higher education) can be considered wasteful until the grossly unequal participation rates have been more nearly equalized—at least to the limit of what can be remedied with the reallocation of public resources. The remedy would feature very substantial increases in financial aid. These could be paid for, if necessary, by substantial cuts elsewhere in the institution—in this case not to appease budget cutters or to meet some ephemeral standard of "efficiency" or "productivity," but to attain this new priority, which is *the more nearly equal participation by socioeconomic class, at least to the limit of what can be secured with financial aid.* Or, the necessary and substantial increases in need-based financial assistance could be realized from very high tuition increases to upper-middle and upper socioeconomic classes and from introduction of a "high tuition-high aid" policy.

"High tuition-high aid," however, has serious practical and political liabilities (Johnstone 1999a). For example, governors and legislators like the part about "high tuition," but less so the part about "high aid." Also, we know little about the enrollment behavior of this marginal student—that is, the student for whom the decision to go to college, and where to go, and whether to persist is truly an open decision and particularly susceptible to variations in tuition and financial aid. The need for a major increase in need-based financial assistance (or even a rollback in some tuitions) is not what conventional critics have in mind when they speak and write of "waste" and "out-of-control costs" in higher education. The brightest and most highly motivated students—especially if they are from and affluent families—are going to continue to go to the most selective college. Greater equality will not be served if only public colleges foreswear all other traditional funding priorities in order to pour maximum resources into financial aid for the poor and the ambivalent. A tentative answer to the "insensitivity" charge, then, is that the issue, however profoundly important, is probably not one that can be solved by shifts in higher education's spending priorities.

Are we overselling our product?

Overselling as a construct of excessive cost or waste signals a number of practices, all suggesting to critics not so much excessive spending per student, but *excessive numbers of students.* For example, some U.S. colleges and universities accept students for university or baccalaureate studies (including those accepted into two-year "transfer" programs) who would be deemed academically unacceptable for what could be called university studies almost anywhere else in the world. They are accepted for baccalaureate study in the United States in spite of the fact that they

have not yet mastered the learning expected of a graduate of an academic secondary school. Part of the alleged waste, therefore, is the considerable need for remediation in U.S. colleges and universities—seen by critics of the practice as "paying for the same education twice."

Another part of alleged waste (again, true mainly of the non-selective college) is the high dropout or non-completion rate.[5] Even for those who ultimately derive benefit from their higher educational study, the prolongation of the time-to-degree—frequently accompanied by excessive number of *credits*-to-the-degree—is considered by some critics to be a waste of time and resources.

Furthermore it is alleged that some of these marginal students are encouraged to take—again, at taxpayer expense—more higher education than is likely to benefit either them or the larger society. Thus, students for whom a two-year degree may be a "stretch," albeit an appropriate one, are told that they ought to seek a bachelor's degree; those who finish (if barely) the bachelor's degree are told that they ought to pursue a masters. And so it goes until American universities are producing, at public expense, far more Ph.D. degrees than is appropriate either for the students, the disciplines, or the taxpayer paying the bill. And although this overselling may be done under the noble banners of "opportunity" or "equality," the real interest of the academy is said to be in its own jobs and in the revenue these students bring in the form of public funds and/or tuition.

Portions of this broad charge of waste are simple exaggeration. For example, some public systems are denying entry into a senior college to any student in need of remedial work in any core subject. Trustees or governors advocating such a policy may be quite content for these underprepared students to be given remedial instruction, still largely at taxpayer expense, at a community college or in the local school system. But the true "production cost" of remedial instruction—a function mainly of student/teacher ratios and average faculty or teacher compensation—is not necessarily any higher at a senior college or university than at a community college or a high school. In fact, at the level of a senior college or university, the remediation will almost certainly be done with part-time adjunct faculty, or graduate students, or non-tenure-track staff, whereas at the high school or community college, it may well be performed by regular teachers at much higher rates of compensation.

Furthermore, it is not clear that a community college or night school setting is more conducive to learning than a baccalaureate college or university for students deemed to be underprepared. Part of the reason that this admittedly marginal student might be underprepared is that

[5]Other countries (e.g., Italy) also have prolonged times-to-degree and high rates of non-completion. However, the culprit in these countries is almost certainly the form of instruction, or the virtual absence of attention to pedagogy or learning, rather than to the number or the lack of preparedness of the entering student.

he/she was totally unmotivated (or worse) by the social and/or instructional ambiance of the high school. If so, it is likely that the night school will have much the same "feel," as may the nearby community college. Clearly more research is necessary on what institutional setting is more conducive to learning for different kinds of marginal or underprepared students. But if this student is to be given a second chance (and the case in favor of this seems overwhelming—but is not the topic of this chapter), this second chance can arguably be done as or more cost-effectively with the right program in a senior college or a university than in some less collegiate or university-like setting.

The charge that higher education is being wastefully oversold—in effect, *overenrolled*—can only be answered by placing a value on the very high level of accessibility and second chance that American higher education, uniquely in the world, provides. And we seem to have settled that issue. Particularly as long as "college preparedness" in America is so overwhelmingly affected by the socioeconomic setting of the family, the school, and the neighborhood, American values will demand the second (and third) chance that our extraordinarily accessible colleges, both public and private, provide. Open access to, and second and third chances to succeed at, higher education are indeed costly. But these features may also be among the most cost effective ways of fixing at least some of the problems of a society in which (a) higher education is increasingly important to economic and social opportunity, and (b) traditional preparation for college continues to be overwhelmingly correlated with socioeconomic class and race/ethnicity.

Conclusion

All higher education is costly, and it can be expected to continue to increase in unit costs much as any other very labor-intensive service, i.e., at rates somewhat in excess of the rate of increase in the costs of living. Higher education's costs can increase at much greater rates if revenues increase commensurately. So can higher education find economies and cut unit costs when revenue falls short. But there is little evidence of out-of-control costs, especially in the public sector, where cost-effectiveness is a more legitimate public issue.

Naturally, colleges and universities must be vigilant about costs (and admittedly, more so than many have been in the past) because of several features of the enterprise: its labor intensity, its legitimately multiple yet hard-to-measure products, and the essentially professional nature of its principal producers (the faculty), featuring control over their own time and considerable, but highly inefficient, involvement in all decisionmaking. The relatively new public pressure for attention to productivity and cost-effectiveness is a good thing. However, there is abundant evidence that most (but not all) of higher education is well managed, particularly for what it is being

asked by society to accomplish. A little more thoughtful defensiveness on the part of college and university leadership would be welcomed.

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Cost Analysis and the Formulation of Public Policy

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The American public voices considerable concern about the affordability of higher education. As the importance of higher education becomes more apparent to students and parents, concerns about the affordability of this life necessity increase as well. Evidence comes from the Public Agenda Foundation, which conducted telephone surveys of U.S. adults in 1993, and again in 2000. The proportions of respondents who indicated concern about the price of attending college were 47 percent in the first survey and 56 percent in the second. Even in the best of economic times, the concern is substantial (Immerwahr 2000).

With public concern at these high levels, it is no surprise that the U.S. Congress became interested in the topic as well. In 1997, Congress established the National Commission on the Cost of Higher Education and charged that body with conducting a thorough review of college costs and prices. In its report, *Straight Talk About College Costs and Prices*, the Commission recommended that:

> The U.S. Department of Education collect and make available for analysis not only annual tuition and price data but also information on the relationship between tuition and institutional expenditures.
>
> ...IPEDS should be redesigned.... The redesigned survey should include estimates of direct instructional costs by level of instruction, capital expenditures and the replacement value of capital assets. It should also be expanded to improve data (and data comparability) on faculty compensation and workload as well as on factors related to administrative efficiency (National Commission on the Cost of Higher Education 1998, p. 28).

As a follow-up to the work of the Commission, Congress included in the Higher Education Amendments of 1998 (PL105-244) a mandate that:

(1) IN GENERAL.—The Commissioner of Education Statistics shall conduct a national study of expenditures at institutions of higher education. Such study shall include information with respect to—

a) the change in tuition and fees compared with the consumer price index and other appropriate measures of inflation;

b) faculty salaries and benefits;

c) administrative salaries, benefits and expenses;

d) academic support services;

e) research;

f) operations and maintenance; and

g) institutional expenditures for construction and technology and the potential cost of replacing instructional buildings and equipment.

(2) EVALUATION. —The study shall include an evaluation of—

a) changes over time in the expenditures identified in paragraph (1);

b) the relationship of the expenditures identified in paragraph (1) to college costs; and

c) the extent to which increases in institutional financial aid affect tuition increases, including the demographics of students receiving such aid, the extent to which financial aid is provided to students with limited need in order to attract a student to a particular institution, and the extent to which Federal financial aid, including loan aid, has been used to offset the costs of such practices.

In response to the directive from Congress, NCES developed a request for proposals for a national study of costs. The 45-page NCES "statement of work" went into considerable detail about the methodological and definitional problems with the study of costs, and then suggested that they can be overcome through a comprehensive national study that evaluates the factors that determine price through economic analysis using three sets of simultaneous equations: behavioral equations, equilibrium equations, and definitional equations (accounting identities.) Not surprisingly, the proposals to NCES were for studies that cost several million dollars, far beyond the resources available for such a study. As a result, NCES decided: 1) to go back to the drawing board with a preliminary feasibility study; and 2) return to the question of research design by asking a group of experts familiar with the issues to give advice on the best approach to a national study of costs. It is within this context that this paper has been prepared.

The concern with affordability is well placed. At a time when higher education is increasingly the gatekeeper to membership in the middle class, a clear understanding of college prices and the extent to which they present a barrier to college participation is crucial to policymaking. Studies that seek to shed light on these topics are laudable. However, the studies as originally formulated were based on an incorrect premise and, even done well, would not yield the information needed by policymakers to address the affordability issue. This brief paper argues for starting from a different analytic construct and suggests some studies that would respond more directly to policymakers' information needs.

Key Considerations

Several key considerations shape the suggestions made later in this paper. These are discussed briefly below.

The Underlying Rationale

While not explicitly stated, the charge to the Cost Commission and the subsequent mandate given to the Commissioner of Education Statistics appear to be driven by the following underlying assumptions:

1. Prices are largely determined by institutional costs.
2. In order to understand pricing behavior, therefore, it is critically important to understand trends and reasons for changes in components of institutional costs (costs of technology and other capital, faculty compensation, etc.).
3. If one understands institutional cost behavior in some detail, one has the information necessary to make informed policy decisions at the federal level.

From the point of view of this author, this line of reasoning has several problems. First, any line of reasoning that ties prices so closely to institutional costs is fundamentally flawed; institutional revenues as well as costs must be considered in the analytic schema. Second, the level of detail is inappropriate in the study mandated in the most recent Higher Education Amendments. Conducting detailed intra-institutional cost studies can provide Congress with more information than they can absorb—about decisions that are someone else's to make—while diverting their attention from the basic federal policy issue: the role of federal financial aid in relation to prices on one hand and college access on the other. Finally, if affordability really is the issue, then a direct, rather than an indirect, set of analyses is suggested—analyses that focus on students and their abilities to acquire the resources necessary to meet prices that may be escalating even if costs are not.

The Analytic Framework

Howard Bowen, in his extraordinarily thoughtful book, *The Costs of Higher Education*, summarized the rationale for what he labeled the "revenue theory of costs." Simplified, this theory holds that:

1. The dominant goals of institutions are education excellence, prestige, and influence.
2. In quest of excellence, prestige, and influence, there is virtually no limit to the amount of money an institution can spend for seemingly fruitful educational ends.
3. Each institution raises all the money it can.
4. Each institution spends all it raises.
5. The cumulative effect of the preceding four laws is toward ever-increasing expenditure.

> The incentives inherent in the goals of excellence, prestige, and influence are not counteracted within the higher educational system by incentives leading to parsimony or efficiency.... The duty of setting limits thus falls, by default, upon those who provide the money, mostly legislators and students and their families (Bowen 1980, pp. 19-20).

This view of higher education pricing and cost behavior indicates that pricing is less a function of institutional costs than it is of:

- The revenue streams from other sources.
- Market conditions that dictate sticker prices and the level of price discounting required to achieve a student body of the desired size and quality paying prices (discounted as necessary) to yield maximum revenue.

These environmental conditions vary enormously by type of institution and from state to state. In all of this, however, there are several patterns. For public institutions (in most states), tuition increases tend to be the revenue source of last resort—as long as state appropriations are healthy, tuition increases tend to be minimized. Indeed, when state economies are very strong, it is not uncommon to find circumstances in which states "buy down" tuition rates—requiring institutions to decrease tuition levels in exchange for an increased state appropriation. This has been the case, for example, in California in recent years.

However, the reverse situation also obtains; when states' revenues are growing slowly or decreasing and their appropriations to higher education fail to keep pace with inflationary pressures, states allow (and sometimes encourage) tuition levels to rise to cover some or all of the state's shortfalls. This was certainly the case in Virginia and many other states in the early 1990s. As a result, it may well be that the state, rather than institutions, is the beneficiary of rapid in-

creases in prices to students. It is by no means unheard of to find instances in which tuition levels are increased significantly and overall institutional revenues are, in fact, diminished.

At private institutions, the calculus employed to establish prices is considerably different. Here, market conditions and the microeconomics of the "firm" play a major role. For those relatively few institutions that have a demand that far exceeds their capacity to serve it, prices can rise to very high levels before demand declines and total net revenues fall. For these institutions, the only forces that serve to moderate price hikes are a sense of social responsibility, the fear of public disfavor, and concern about the inability to attract a student body with the desired profile—they can fill the seats, but not necessarily with the students they want. Most private institutions, however, do not have the luxury of being able to raise prices with impunity. For most private institutions, students are, by far, the major provider of revenues; the amount of subsidy from other sources is marginal and much of it goes to scholarships. In these institutions, prices are much more affected by costs—but they are also extraordinarily sensitive to market forces. To stay competitive, most private institutions have to keep price levels and increases in line with those of their competitors and be extremely creative in the use of price discounting (institutional scholarships under a wide variety of names and guises) to meet enrollment and total net revenue targets.

Several points are worth noting/repeating at this juncture:

- Tuition levels are as much a function of revenue streams as they are of expenditure patterns. The major influence for the institutions that enroll 80 percent of students is the pattern of state appropriations.
- In many states, tuition levels are established by legislatures or state agencies, not by the institutions. This ties ultimate instructional cost behavior even more closely to state revenue and allocation behaviors.
- Public sector tuitions in turn affect the market within which private institutions compete for students. Since both public and private institutions draw most of their students from the surrounding geographic area, the competitive environments for private institutions are often affected by the funding decisions of very few states and the pricing decisions of relatively few institutions in those states.
- It is only in the most tuition-dependent private institutions that prices and cost behaviors are closely linked. Even in this instance, however, it is important to recognize the direction of causality—the cost patterns emerge *after* the revenue constraints are established.
- Expenditure/cost patterns reflect institutional choices, values, and priorities. They describe choices made *within the limits of resources available*.

The bottom line: detailed analyses of costs will not explain pricing behavior nor provide information of particular help to federal policymakers. If one wants to understand price behavior more fully, it is critical that patterns in alternative revenue sources be analyzed simultaneously. For private institutions, market/competitive conditions must also be addressed.

The Level of Detail

The mandate given to the Commissioner of Education Statistics requires a study done in considerable detail, i.e., trends analyzed by both objects of expenditure (faculty and administrative salaries and benefits, capital renewal and replacement) and by function (academic support, plant operations and maintenance, research, etc.). The Cost Commission recommendations call for even more detail, the calculation of instructional costs by discipline and level of instruction. However, it is important to recall that the Cost Commission was arguing that this kind of analysis needed to be done not by the federal government, but by the institutions themselves, so that they could both strengthen their management of costs and improve their capacity to be publicly "transparent" about them. The Commission felt that the federal government's role should be to help address the transparency of information by changing its protocols for the collection of information, not by substituting a federal study for what should occur at the institutional level. Again, the notion was that if institutions would just manage their expenditures more effectively, prices could be contained.

An effort to strengthen data collection to improve cost measurement would have been beneficial to institutional decisionmakers. Following through on the mandate given the Commissioner—if the intended audience is truly federal policymakers—is problematic on several fronts in addition to the failure to deal with the revenue side of the equation. Among the problems:

1. The level of detail invites defensiveness and conflict. As noted above, these are the kinds of data institutional presidents should want. They help to inform the kinds of decisions college presidents have to make. How much do I have to pay faculty to stay competitive? How many resources should I devote to maintenance of physical assets? Am I spending too much on certain disciplines/functions? The fact is, these are not the decisions that historically have been Congress's to make. If Congress were to reach conclusions and act as a result of these data (for instance, by setting spending limits in certain functional areas, or by setting national standards for spending for instruction) it would fundamentally change the federal role with regard to higher education from being student-centered to direct institutional management. No one is seriously proposing that Congress needs to do that. So why spend so much time, energy, and money getting data inappropriate to the task facing federal policymakers?
2. The data will raise as many questions as they answer. The data will invariably reveal widely varying costs from institution to institution; they always do. Even if the total

level of resources is the same, the way institutions choose to utilize these resources will vary for reasons of both choice and circumstance. Some institutions will solve their developmental education problems through the instruction program, while others will address the same problem through student services activities (tutoring and advising rather than through classroom instruction). The faculty at one institution may be relatively young, at another relatively old. One may be the victim of locally high-energy prices while another may have small utility bills as a function of either location or energy providers—the list goes on. Once started down this path, one is inevitably drawn to the next set of "whys." The appetite for more data will continue to escalate—especially when the data in hand do not answer the key questions (which they won't when the basic analytic framework is wrongly specified).

3. The data will obfuscate more than they enlighten. Detailed cost studies will necessarily yield a great deal of data. Institutional users will be able to pick the handful of institutions with which they want to be compared. For them, the details can provide useful insights. At the national level, these data will reveal what we already know: American higher education is a very heterogeneous enterprise. Institutions that are ostensibly similar will find themselves in different fiscal (revenue) circumstances, choose different ways of fulfilling their missions and, as a consequence, have very different cost patterns. The greater the effort to get detailed institutional cost data, the greater the likelihood of attaining precision on variables that are inappropriate for the federal policymaking task at hand.

The Alternative

If detailed institutional cost data are not the most useful data for understanding affordability issues and informing policymaking at the federal level, what would be better? Two analytic activities would contribute much to an understanding of the phenomena at work here:

- A study of revenue streams to *institutions* and the relationships between federal funding policy and those of other funders, particularly state governments.
- A study of revenue streams to *students* and the ways in which changes in federal policy have affected their behaviors and choices.

The institutional study would really be a group of related studies needed to deal with the variety of institutions. For public institutions, there is a need to do macro-level studies by type of institution *and by state* to address such questions as:

- How have tuition revenues changed as a proportion of total (unrestricted) revenues?
- Do the patterns of change in tuition (rates and revenues) and in state and local appropriations move in tandem or in opposition?
- Who sets tuition rates? Is this decision out of the hands of institutional decisionmakers?

- How has *net* price to students varied relative to changes in revenue streams?
- How have expenditure patterns changed relative to state appropriations and other sources of revenues? Relative to the CPI?

One can expect to find great variation from state to state in both overall affordability (net prices relative to ability to pay) and in the steps taken by states to keep college within the reach of students of all economic circumstances. (The alternative strategies of low tuition versus high tuition/high aid being the obvious ones.) One can also expect to find variations between types of public institutions, particularly in those states in which the institutions have a great deal of latitude in establishing tuition and where some of the institutions have achieved the stature of "national" institutions (the Universities of Michigan and Virginia, for example). For this small set of institutions, it would be useful to compare their patterns of tuition changes with those of the elite, selective private institutions (see below).

Throughout, the questions that should be the center of attention are:

1. How much of the change in institutional prices can be explained by state funding levels?
2. How have state policies changed in reaction to federal policy initiatives?

The hypothesis is that since the role of the states is so central to establishment of prices in the public sector, understanding the effect of federal initiatives on state policy and action is a more fruitful approach than investigating relationships between federal and institutional actions without explicit recognition of state-induced responses.

It is important to approach analysis of private institution behaviors by making distinctions between types of institutions and by state as well. Here, type of institution is best characterized as 1) very selective, and 2) all others, both without regard to typical Carnegie classifications.

The institutions in the "all other" category seldom have significant revenues in addition to those that come from tuition. Assessment of expenditure changes and price increases at these institutions—and the relationship of changes and trends to federal student financial aid policy—offers the best natural laboratory for following through on the set of assumptions implicit in the mandate to the Commissioner of Education Statistics. Because so many of the competitive forces impinging on the less wealthy private institutions come from regional institutions, it is appropriate to conduct analyses of private institutions on a state-by-state basis as well. Such analyses would allow an investigation of private institution price patterns relative to those in public colleges and universities under a wide variety of circumstances for their public counterparts—from large price increases to price decreases, often in the same states over time (e.g., California and Virginia).

This state-by-state approach to analyses for private institutions has the added benefit of making explicit state-to-state variations resulting from high state aid in states such as Illinois, Pennsylvania, New York, and Minnesota. Such analyses would provide an additional window on the interrelationships between federal and state policies.

Analysis regarding the more selective institutions—those for which demand is much greater than capacity, theoretically allowing much greater freedom in pricing decisions—is more complicated. These institutions also provide an opportunity to reapply Bowen's revenue theory of cost in the current fiscal environment. The complications arise from the fact that the behaviors of these institutions will be shaped by forces that will be hard to quantify in any reasonable way, forces such as public opinion and media attention (both positive and negative).

For these institutions, it is also important to include data about student "quality" in the mix. The key questions for these institutions are:

- How do tuition prices (especially net prices) respond to changes in other sources of revenue? To changes in federal policy?
- Is there evidence that they are getting more selective?
- Is there evidence that state policy plays a role in pricing decisions at these institutions, for example, through major changes in state financial aid programs?

The student study suggested is based on the following propositions and observations:

- If affordability is the issue being investigated, then direct assessment of the impact of federal policy—as seen through the eyes (and revealed in the behaviors) of students—should be a central focus of information-gathering to inform policymaking.
- Price—and very frequently affordability—differs by type of institution (public/private, two-year/four-year). Any assessment of affordability must reflect this reality.
- The large majority of students attend college in their home states; and the lower the students' income (those for whom affordability is a primary issue), the more likely this is to be true.
- States have very different policies on (public) institution pricing and their own student financial aid programs. Consequently, affordability varies considerably from state to state as well as by type of institution. Any assessment of affordability must address this reality as well.

There is a substantial amount of data available about students and affordability as it varies by such characteristics as family income and race. Additional investment in the acquisition and compilation of data that would start with these necessary distinctions and provide additional information about net prices for students a) enrolled in different kinds of institutions (making at

least three distinctions—public 2- and 4-year and private), and b) on a state-by-state basis would be enormously useful. Such data would clearly describe differences across the states and provide important insights into the effectiveness of different state policies in attaining the affordability objective.

These data would also provide grist for a second kind of state-by-state analysis, an assessment of affordability in conjunction with state policy actions taken in light of federal policy initiatives. For example:

- Have states changed funding or policies in reaction to implementation of federal tax credit legislation?
- Is there any relationship between state policy changes and the underlying patterns of affordability?

This analysis would shed more light on whether or not the key question for federal policymakers is the impact of their policies on the behaviors of states rather than institutions.

The Bottom Line

Efforts to understand prices must begin with an analysis of trends in revenue patterns. An analysis of revenue patterns on a state-by-state basis will be more helpful to policymakers—and less invasive of the decisionmaking domains of institutional leaders—than will attempts to develop detailed cost data. The relationships of greatest interest will likely be:

1. Federal policy initiatives and state responses;
2. State behavior (appropriations) and institutional price responses.

The least productive line of attack is likely to be that of detailed assessment of costs. Such analyses will indicate how institutions are allocating constrained resources without helping to understand the source of those constraints.

If Howard Bowen's revenue theory of cost has merit and if states wield policy influence to a degree commensurate with their share of institutional support, analysis of state funding and influence on tuition levels and affordability becomes the obvious starting point in the search for information that has utility for federal policymakers.

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Institutional Financial Health: Tuition Discounting and Enrollment Management

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There has been much talk in the press in the last several years about tuition discounting: What is it? What impact has it had on the price and cost of higher education? Ten years of tuition, financial aid, and enrollment data are available from the National Association of College and University Business Officers (NACUBO) tuition discounting survey of independent institutions,[1] allowing greater examination of these questions.

Tuition discounting is a very basic concept: institutions charge students less than the published tuition price to attend a college or university. In the past few years, questions have been raised about where the higher education industry is moving in terms of its pricing and financial aid strategies. Some of these questions address trends, such as: Is tuition going to continue to increase? Are schools going to continue their practice of providing scholarships to significant numbers of students? Will the published price continue to lose meaning and, if so, what will be the consequences? Other questions, however, look at the impact of pricing and discounting strategies on various aspects of the enterprise, including access to higher education, cost containment, resources available for programmatic enhancements, the quality of higher education, and the financial equilibrium of higher education.

This paper examines some of the trends and issues that have affected institutional practices regarding tuition discounting, particularly at independent institutions. Data from the NACUBO survey set the stage for a discussion of enrollment management, focusing on the complex set of factors that institutions must consider in their decisionmaking processes.

[1] In this commissioned paper, private not-for-profit institutions are referred to as "independent institutions."

The Tuition Discounting Data

The National Association of College and University Business Officers (NACUBO) has conducted a tuition discounting survey of independent institutions for the past 10 years. Surveys are sent to all four-year accredited, independent institutions. In 1999, responses were received from more than 350 independent institutions. For 1998 and 1999, there are complete data from 348 institutions, and for the entire 10 years, there are data from 276 institutions. The institutions have been divided into three categories for purposes of analysis in this paper:

- "Best" liberal arts colleges, representing 40 institutions identified by *U.S. News and World Report* as the best national liberal arts colleges. Data from 24 of those institutions are included.
- "Best" private universities, from those institutions identified by *U.S. News and World Report* as the "best" national universities. Among the best universities, 34 are private and 16 are public; the NACUBO database includes 13 of the 34 private universities.
- "Other"colleges and universities, including the other institutions in the NACUBO database not considered "best" as defined by *U.S. News and World Report*.

The following findings emerge from a review of the NACUBO data:

1) Fewer and fewer students are paying the published tuition price

In fall 1990, 63.7 percent of students received institutional financial aid, compared with 79.4 percent in fall 1999 (table 1). Reviewing the data by type of institution indicates that the growth in institutional grant aid to students at the "best" institutions has been markedly less than at the "other" private institutions.

Table 1.—Percent of freshmen receiving institutional grant aid by type of institution: 1990 to 1999

	1990	1993	1996	1999
"Best" LA Institutions	44.5	48.3	52.7	49.3
"Best" Universities	38.9	41.2	44.3	46.2
Other Institutions	66.8	74.1	80.1	83.8
All Institutions	63.7	70.6	76.3	79.4

Further examination of the data reveals that the percentage of students who received no institutional financial aid decreased significantly between 1990 and 1999. Table 2 shows that in 1990, 5.1 percent of the institutions aided less than 30 percent of the freshmen enrolled; 28.4

percent of the institutions aided more than 80 percent of their freshmen. By 1999, less than one percent of the institutions aided fewer than 30 percent of freshmen, and more than 60 percent of the institutions aided more than 80 percent.

Table 2.—Percentage distribution of freshmen receiving institutional grant aid: 1990 to 1999

	All Institutions		
	1990	1995	1999
0–30%	5.1	1.5	0.7
30.1–40%	12.0	6.5	3.6
40.1–50%	14.5	7.6	8.7
50.1–60%	12.0	9.5	6.5
60.1–70%	11.6	7.6	7.6
70.1–80%	16.4	17.8	12.0
80.1–90%	14.2	27.3	17.5
90.1%+	14.2	22.2	43.3

2) The average grant as a percentage of tuition has remained relatively stable

How much an institution spends on financial aid can be determined by combining the average size of the financial aid award along with the number of students who receive awards. Table 3 indicates that for those freshmen that received institutional aid, their grant as a percentage of tuition at all the institutions had increased from 45.2 percent in 1990, to 48.1 percent in 1999. Thus, while aid has become much more widely dispersed across an entering class, the average award as a percentage of tuition has not changed significantly. The data also indicate that the average award at the "best" institutions is significantly larger as a percentage of tuition than at the "other" institutions.

Table 3.—Freshman grants as a percent of tuition, by type of institution: 1990 to 1999

	1990	1993	1996	1999
"Best" LA Institutions	65.2	62.5	61.5	64.4
"Best" Universities	56.3	58.3	58.1	58.5
Other Institutions	42.8	43.9	44.9	46.1
All Institutions	45.2	46.1	46.8	48.1

3) Published tuition has increased much more than net tuition

Between 1990 and 1999, the average published tuition at the independent colleges in this database increased from $9,838 to $16,493, an increase of 67.6 percent (table 4). In 1999, there was only one institution among the survey respondents that lowered tuition from its 1998 level, and one institution that did not raise its tuition: this is in marked contrast to the previous year when six institutions lowered tuition and 13 institutions held tuition at the 1997 level. In 1999, only five institutions increased tuition more than 10 percent, compared with 12 in 1998. The average increase in 1999, across all schools, was 4.6 percent compared with 4.0 percent at the "best" institutions.

Table 4.—Tuition rates and percent increase, by type of institution: 1990 and 1999

	1990	1999	Percent increase	
			Over the period 1990 to 1999	In 1999, from the previous year
"Best" LA Institutions	$14,329	$23,008	60.6	4.0
"Best" Universities	14,518	23,603	62.6	4.0
Other Institutions	9,178	15,258	69.2	4.6
All Institutions	9,838	16,493	67.6	4.6

The increase in net tuition per student at the "best" institutions has lagged only slightly behind the overall increase in tuition over this 10-year period (table 5). The increase in net tuition at the "Other" institutions has increased 43 percent compared with a tuition increase of 69 percent. Net tuition has grown from $7,121 in 1990 to $10,335 in 1999 at all institutions, while at the "best" institutions net tuition now exceeds $15,000. Between 1998 and 1999, net tuition and tuition increased at about the same rate at all types of institutions except the "best" universities. This is a clear indicator that institutions are getting better at strategically discounting in order to accomplish their enrollment and revenue goals.

Table 5.—Net tuition rates and percent increase, by type of institution: 1990 and 1999

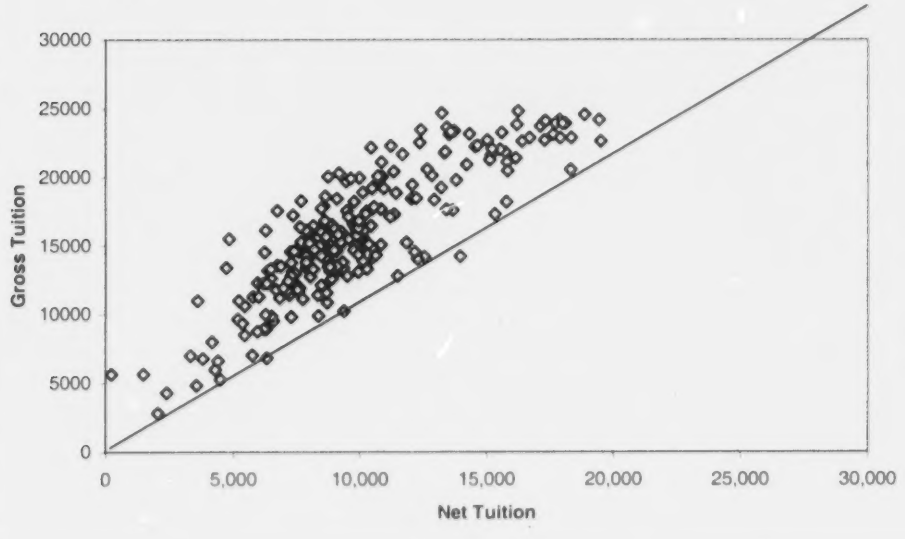
	1990	1999	Percent increase	
			Over the period 1990 to 1999	In 1999, from the previous year
"Best" LA Institutions	$10,240	$15,789	54.2	4.2
"Best" Universities	11,435	17,395	52.1	2.5
Other Institutions	6,608	9,476	43.4	4.1
All Institutions	7,121	10,335	45.1	4.0

Notwithstanding improvements in rates of growth of financial aid, the fundamental conclusion from the survey data remains that less of the stated price of attending a college or university is ultimately reflected in revenue available to purchase educational services. In 1990, the average net tuition of $7,121 was 75.9 percent of the average gross tuition rate of $9,838. By 1999, the average net tuition rate of $10,335 was a significantly lower 62.7 percent of the gross rate.

Discussing the average changes at institutions masks the significant differences that individual institutions are experiencing. For example, between 1998 and 1999, 27 percent of the institutions experienced decreases in net tuition per student. This rate is, however, a real improvement from earlier in the decade (1990–91) when 35 percent of the institutions experienced a decrease in net freshman revenue. More than one-third of the institutions with decreases in net tuition per student in 1999 experienced decreases of more than 5 percent. On the other hand, 16 percent of the institutions experienced increases in net tuition per student of more than 10 percent.

Figure 1 shows the relationship between gross and net tuition in fall 1999 for freshmen. The solid line represents equality between gross and net tuition, i.e., no institutionally funded financial aid and no discounting, a condition that no institutions met.

Figure 1.—Published tuition versus net tuition



There is a wide range in the relationship between published tuition and net tuition. For example, among institutions with a published tuition of $10,000, the net tuition ranged from less than $5,000 to just under $10,000. The differences in the relationship between net tuition and gross tuition reflected the college's institutional financial aid or discounting policies. In 1999, there were 39 institutions where net tuition was less than 50 percent of the published tuition rate.

Also, in 1999, 94 institutions experienced a decrease in net tuition per freshman, 103 institutions experienced a decrease in net freshman revenue, and 150 institutions had smaller freshmen classes in 1999 compared with 1998. Of the 193 institutions experiencing larger freshman classes in 1999 as compared with 1998, 51 experienced decreases in net tuition per student and 14 experienced decreases in net freshman revenue.

The impact of these changes in enrollment on the financial health of the institution depends greatly on the institution's relative capacity. If an institution has excess capacity in terms of facilities and faculty, it can increase enrollment with few (if any) additional expenditures. The institution can improve its economic health if there is at least some small increase in net revenue. On the other hand, if the enrollment increase was achieved by increasing institutional financial aid to such an extent that the institution's net revenue fell, then the financial health of the institution will have deteriorated.

When an institution experiences an increase in enrollment and it is already at capacity, additional students will require additional expenditures. If the institution has attained the additional students through significant increases in financial aid, the college will be in the worst of all possible situations, expenditures up and net revenues down. If net revenues increase more than the increase in expenditures, however, a college may experience an increase in enrollment—requiring increased expenditure—and still gain.

4) Relationships between changes in gross tuition, net tuition, and freshman enrollment vary significantly by institution, but all have increased in the aggregate

Between 1998 and 1999, total freshman enrollment increased 2.7 percent overall at the 348 independent institutions in this database, while average gross tuition rates increased 4.7 percent and average net tuition increased 4.1 percent (table 6). The gap between the increase in gross tuition and net tuition has been narrowing in recent years, indicating that as institutions increase tuition, financial aid has increased only slightly more than the increase in tuition. In earlier years, more of the increase in tuition was being offset by even larger increases in institutional financial aid.

Table 6.—Enrollment, tuition, net tuition and percent change: 1998-1999

	1998	1999	Percent Change
Total Freshmen Enrollment	494	507	2.7
Average Tuition	$15,283	$15,995	4.7
Average Net Tuition	$9,485	$9,871	4.1

Among these institutions, freshmen enrollment increased at 193 institutions (55 percent), tuition increased at 346 institutions (99 percent) and net tuition increased at 275 institutions (75 percent). In addition, net freshman revenue increased at 255 institutions (73 percent).

5) Tuition discount rates at the independent institutions continue to increase

The tuition discount rate used in this study is defined as institutional financial aid dollars divided by the gross tuition and fee revenue. The discount rate also may be calculated by multiplying the percentage of students receiving institutional financial aid by the average grant awarded as a percentage of tuition. Both methods lead to the same result. The percentage of students receiving aid increased by 28.9 percent between 1990 and 1999 while the average grant as a percentage of tuition increased 6.3 percent over the same period. Clearly, both variables contribute to the increasing discount rate displayed in Table 7.

Table 7.—Tuition discount rate for freshmen, by type of institution: 1990 to 1999

	In percent			
	1990	1993	1996	1999
"Best" LA Institutions	29.0	30.2	31.5	31.6
"Best" Universities	21.0	23.3	24.6	26.3
Other Institutions	28.0	32.0	34.8	38.4
All Institutions	27.7	31.5	34.0	37.3

Overall, the discount rate in 1999 was 37.3 percent compared with 27.7 percent in 1990. The discount rates at all but the "best" universities were comparable in 1990, while by 1999 the discount rate at the "best" institutions was significantly lower than the discount rate at the "other" institutions. The discount rate at all institutions increased 35 percent between 1990 and 1999.

The frequency distribution in figure 2 shows that in 1990 only 15.7 percent of the institutions had freshman discount rates above 40 percent and more than 62 percent had discount rates of less than 30 percent. By 1999, more than 40 percent of the institutions had discount rates

above 40 percent and 25.9 percent had discount rates of less than 30 percent. This is a significant change in college pricing policies.

Figure 2.—Frequency of tuition discount rates: 1990 and 1999

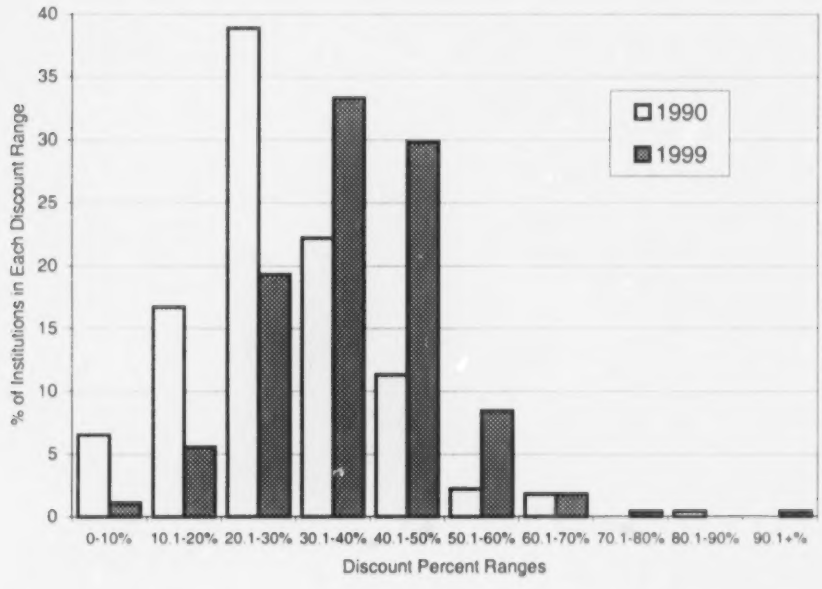
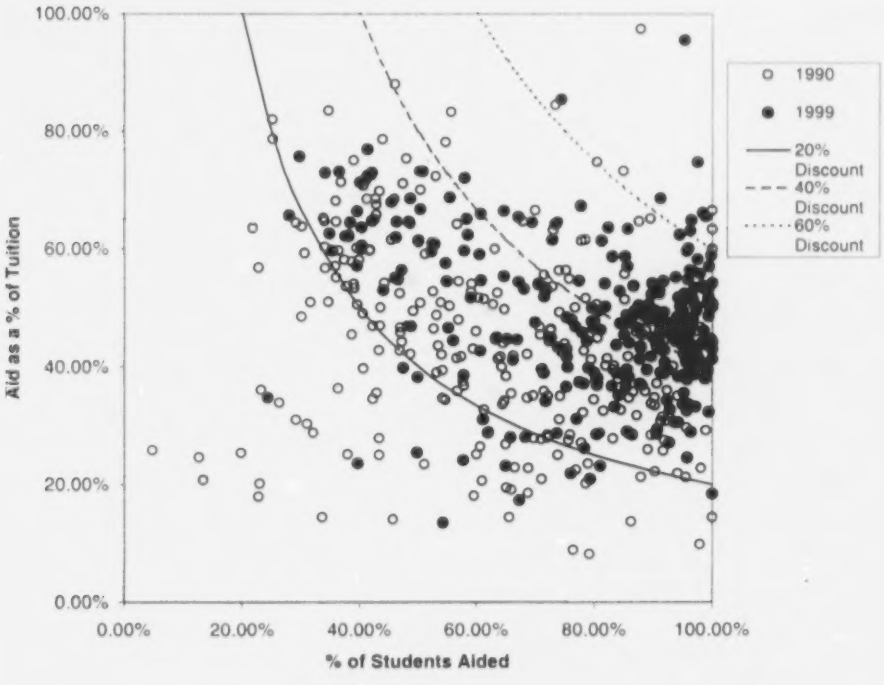


Figure 3 shows the many different combinations of average grant and percentage of freshmen aided that an institution uses to achieve its discount rate. The figure also indicates how the percentage of freshmen aided has increased between 1990 and 1999 while the average grant has stayed relatively constant during this period.

In the figure, it is easy to see how many institutions have increased the number of students receiving aid, as the 1999 data points are clustered at the right end of the graph while the 1990 data points are more spread out. The discount rate has increased in large part through a significant increase in the percentage of students receiving institutional grants, compared with the average grant as a percentage of tuition. One can only speculate that some institutions find it advantageous from a marketing point of view to discount their tuition to all students.

Figure 3.—Component analysis of tuition discounting

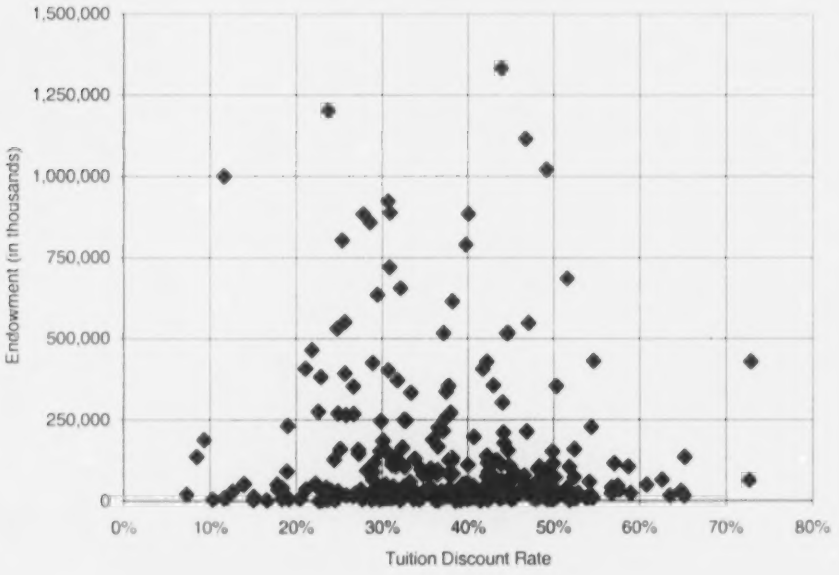


6) There is no relationship between the endowment and the discount rate

It has often been assumed that there is a positive correlation between a college's endowment and its ability to provide financial aid. Figure 4 shows the institutions in the study arrayed by endowment levels and discount rates and demonstrates that there is no significant relationship between endowment size and the tuition discount.[2] While there is a slight shift to higher levels of tuition discounting as endowment values decline, the difference between the $1+ billion endowment schools and the less than $50 million endowment schools is only 6.2 percent—much less than the relative difference in their institutional wealth. Further, there are wide ranges in discounting levels in each tier of endowment making the averages for each tier less indicative of individual experience.

[2]A few very high endowment institutions and one very high discount college are not displayed on the graph so that the data for the rest of the institutions may be shown more clearly.

Figure 4.—Institutions grouped by endowment and discounting levels



Put more simply, relative institutional wealth or poverty does not sharply affect the level of financial aid. Institutional aid is an enrollment management tool. The granting of aid to a significant percentage of the class is necessary to fill the class with the number and quality of students needed, as most institutions are unable to enroll an adequate number of qualified students at their published price. We must continue to ask, are we on a pricing merry-go-round? Or is the current pricing strategy a rational and appropriate method for attracting the best mix of students to each institution?

Table 8.—Freshman tuition discount rate and number of institutions by endowment size: 1999

Endowment size	Freshman discount rate (percent)	Number of institutions
$1 billion +	31.8	13
$500m–$999m	33.7	19
$250m–$499m	35.1	24
$100m–$249m	37.6	54
$50m–$99m	41.4	50
0–$49m	38.0	188

The Institution's Perspective

The NACUBO data show that on average (and for an overwhelming majority of the independent institutions), financial aid has increased faster than stated tuition rates, resulting in decidedly lackluster and in many instances, negative, real revenue (net tuition) growth. While financial need, unmet by federal and state aid, has driven some of the increase in institutional financial aid over the past 10 years, an increasingly pervasive trend has been the addition or substitution of merit or characteristic-based aid to enhance the marketing of high-priced educational services to price-sensitive middle class and affluent families.

At the heart of this issue is the confluence of each institution's need for a robust revenue stream to keep their institution competitive, and families' willingness—or in many cases unwillingness—to pay the published price. The core of the strategy is to provide incentives to those desirable students who are able to pay, according to the traditional need-based aid formulas, but are unwilling to pay the sticker price. Thus, one must ask whether discounting actually increases revenue available by increasing enrollment or if it takes resources away from needy students or programmatic improvements by subsidizing students who can already afford to attend. The answers to these questions differ by institution, and the answers in the aggregate are unclear.

Enrollment management today is a complex, strategic process. Each institution wants to maximize enrollment of the students it deems most desirable at the least cost in terms of institutional financial aid. In economic terms, an institution wants to "milk the demand curve." In order to accomplish this, fairly sophisticated modeling of the yields for different types of applicants is required. Among students who are interested in attending an institution, there are those who are willing and able to pay the published tuition price, those who are willing but unable to pay, and those who are able but unwilling to pay.

Colleges need to be able to distinguish among these three groups of students and then decide how much the college wants each student. To decide how important each student is to the college, the college determines how much institutional aid it is willing to provide that student to improve the probability that he/she will enroll. Fully implementing this practice can often conflict with an institution's values. Institutions often will stop short of the true revenue maximization solution because they are unwilling to treat similar students differently. (For a discussion of student demand for attending an institution, see the appendix to this paper.)

Table 9.—Assessment of applicant pool by reader rating

Reader Rate	A	B	C	D	Total
Applicants	300	600	600	500	2000
Admits	300	600	550	200	1650
Acc. Rate	100%	100%	92%	40%	83%
Enrolled	135	120	130	80	465
Yield	45%	20%	24%	40%	28%
Disc. Rate	75%	38%	15%	30%	41%

Most institutions categorize their applicants according to the attractiveness of the applicant. Table 9 presents an example of an applicant pool encountered by many institutions, with A being the most attractive and D the least attractive. In this hypothetical example, the institution received 2,000 applications. This hypothetical institution will admit all of the A and B applicants, 92 percent of the C applicants and 40 percent of the D applicants, giving the institution an overall acceptance rate of 83 percent. The next row indicates the number of admitted students who enrolled, and the fifth row presents the yield—the percent of admitted students who enrolled. Overall, this institution has a 28 percent yield rate but it has yielded 45 percent of the A students, 20 percent of the B students, 24 percent of the C students, and 40 percent of the D students. These results seem somewhat anomalous, as one would expect the yield to increase as the student rating decreases. This result is due in large part to the different prices charged as indicated by the discount rate. The A students had a tuition discount rate of 75 percent—meaning that they only paid 25 percent of the published price at this institution—while overall the discount rate is 41 percent. Table 10 illustrates this more clearly.

Table 10.—Analysis of freshman class quality by net tuition

	QUALITY RATING				TOTAL	
NET TUITION	A	B	C	D	#	%
$12,000 (Full Pay)	-	-	20	22	42	9.0%
$10,000 - $11,999	-	-	71	19	90	19.4%
$8,000 - $9,999	-	42	24	9	75	16.1%
$6,000 - $7,999	-	68	10	7	85	18.3%
$4,000 - $5,999	23	5	3	8	39	8.4%
$2,000 - $3,999	90	4	1	7	102	21.9%
$1 - $1,999	20	1	1	8	30	6.5%
$0	2	-	-	-	2	0.4%
Total	135	120	130	80	465	100.0%
Average Net Tuition	$3,000	$7,440	$10,200	$8,400	$7,080	

Only 42 of this institution's 465 freshmen paid the full tuition price, 9 percent of its class. Overall, this institution collected an average of $7,080 per student as compared with the published tuition price of $12,000, a discount rate of 41.5 percent. No A or B students paid the full price; each of these students received significant scholarship aid from the college. The average net tuition paid by the A students was $3,000, $7,440 for the B students, $10,200 for the C students, and $8,400 for the D students.

In analyzing the relationships between its yield and price structure, an institution might explore the following questions: did it need to award full tuition scholarships to any students, or would they have enrolled with less aid? What if the college had discounted somewhat more to C students and somewhat less to D students? Would the college have increased the quality of the class at the same expenditure? Could or should the college have accepted more D students, reduced the aid offered to them, and still have enrolled the number of students projected?

A more radical question is whether the institution would have been better served to have reduced its published price to $7,080 and not provided any scholarships. Would it have attained the number of students that it needed? Would it have gotten the quality of students that it wanted? There have been a few experiments with significant reductions in the published price, Muskingum College being among the most discussed and analyzed. As I understand the situation at Muskingum, prior to the price reduction, almost all (if not all) of the students were receiving relatively significant scholarships. Muskingum's research indicated that a price decrease would

be well received, but parents and students also wanted scholarships as well. It should be noted that Muskingum continued to discount its tuition even after it lowered its price but the discounting was significantly less. Muskingum experienced an enrollment increase the following fall so it appears this strategy was successful.

What, then, is the rationale for increasing published tuition? Many institutions fear that students relate price to quality (what some call the "Chivas Regal effect"), and that a lower price will lead students to put that institution in a lower quality group. There is not much empirical evidence on this phenomenon but it is a strongly held belief. Many institutions find that parents and students resonate to scholarships, which are awarded based on the "outstanding" characteristics of the student, and therefore, they need to continually increase their published price in order to offer significant amounts of selective discounting.

Might a high price keep some people from applying to an institution? Maybe. One strategy that several institutions are using to reduce the number of prospective students who are "scared off" by a high published price is to announce that a student with certain characteristics will receive a scholarship. Some institutions will give full tuition scholarships to any students who rank number one or two in their high school class. Others are trying to provide cost information earlier on to those who are unable to pay the published price. For example, Princeton placed a financial aid estimator on its website to provide estimates of what a family will have to contribute.

To the extent that merit aid or characteristic-based aid strategy has been substituted for need-based aid, this enrollment management approach has reduced educational access to the economically disadvantaged while providing financial subsidies to those with the ability to pay. It has also reduced resources available for educational programming. Clearly, if an institution could fill its classes with "appropriate" students, however defined, there would be more funds available for programmatic improvements or less need to increase tuition as quickly as it has been.

Historically, the wealthiest colleges and universities in the country espoused "need blind" admissions policies, meaning that a student's ability to pay was not considered in the admissions process. These institutions would promise to meet the full need of all accepted applicants by providing all the aid a student needed to attend the institution, calculated according to accepted formulas. Today, at many institutions the new term is "need aware," meaning that an applicant's financial need is a consideration in the admissions process. Most institutions engage in what is called strategic packaging. This means that an institution will consider both the financial need of the student and the attractiveness of that student to the institution in meeting its enrollment goals in developing the aid package offered. Students with similar financial need but different academic or other characteristics are likely to get different aid packages; the more desirable student

will be awarded significantly more grant aid than the other, who may be offered much more of his or her package as a loan. Some institutions take the concept of strategic packaging beyond a sorting for academic credentials to attempt to measure explicitly willingness to pay and to adjust aid up or down on the basis of probability of enrollment.

Final Thoughts

National trends over the last 10 years show the impact of strategic enrollment management on the competitive environment of higher education. These trends suggest that as institutional and consumer sophistication grows, the stakes continue to increase.

Many of us believe that the growing practice of tuition discounting is in part a response to better consumer understanding of the relation between convenience, service, quality, and cost. Competition is fierce for academically stellar students in higher education, particularly between independent institutions and flagship public universities. It is also fed by the commodity-like marketing presentation and comparisons of educational services by the national ranking services.

Certainly, whatever the driving forces underlying the shift towards characteristic-based aid, this strategy—using aid to attract and retain the unwilling to pay—will feed upon itself. Because this approach goes beyond more objectively measured need (however flawed and flexible the federal and institutional methodologies may be for determining student need) into the discretionary application of funds, characteristic-based aid can, and predictably will, be much more subject to escalation in response to competition among institutions.

As a final note, the role of tuition discounting in public institutions is not as well understood as in independent institutions. Many of these institutions are using similar discounting and marketing techniques to those described in this paper. The practices of public institutions need to be studied if we are to get a comprehensive understanding of tuition pricing and discounting strategies in higher education.

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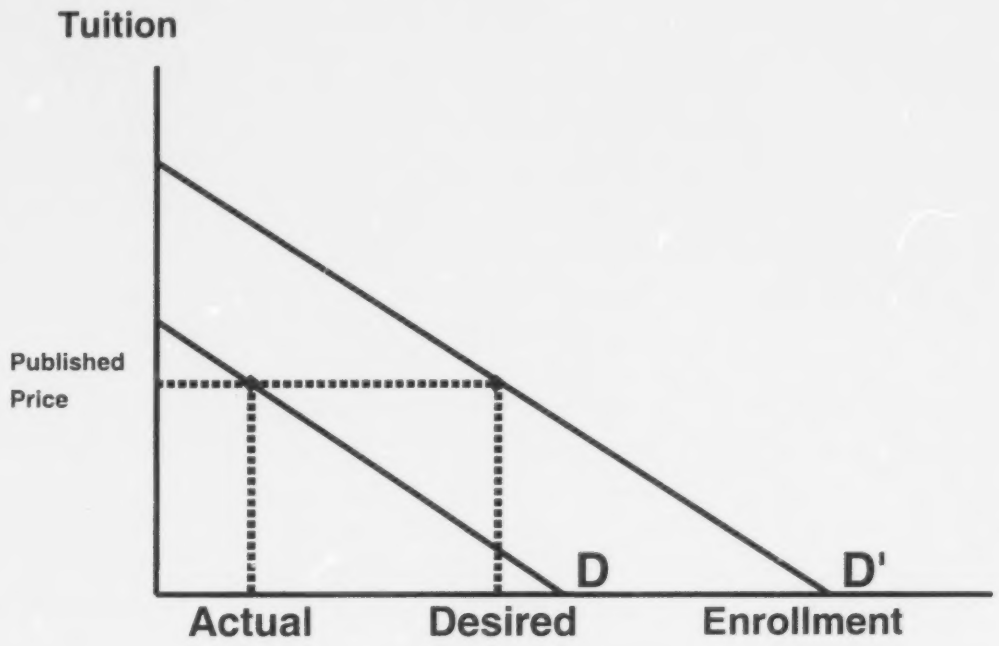
Appendix —Student demand for a college



In this graph, the first line (D) represents an institution's demand curve. At the published price, the institution can only attract the "actual" enrollment, which is represented by the intersection of the first dotted line with the (D) demand curve. The institution wants an enrollment equal to the "desired" enrollment. In order to enroll this number of students, the institution must discount its price to each of the additional students between the actual number and the desired number of students. The institution will work its way down the (D) demand curve reducing the price to each successive student. If the institution had perfect knowledge about each student's willingness and ability to pay, it would charge each student a different price. In reality, though, the institution will provide a variety of scholarships to different students, either losing some potential revenue or some potential students. The ideal situation for an institution would be for its demand curve to increase—indicating that more students want to go to that institution. This situation is represented by the second (D') demand curve. On the D' demand curve, desired enrollment for the institution can be achieved at the published price. There are very few institutions in the country that face this situation, and even those that do will usually discount to some students in order to economically diversify their student body.

Issues of Cost and Price in Higher Education: Observations on Needed Data and Research

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Introduction

This brief paper offers our perspective on some key issues in the analysis of higher education finance. As requested, our comments are organized around issues of cost and price in higher education. It is, however, our view that it is hard to think productively about those questions without linking them to issues of enrollment, financial aid and economic returns. We take note of these related questions as appropriate.

We comment first on changes over time in "sticker prices" and next on changes in net price. We conclude with thoughts on future analyses in this area.

Changes in Sticker Price

Over the last decade, "sticker prices"—charges to students gross of student aid—have risen significantly faster than the price level in both public and private higher education. In the background, however, trends in the underlying costs of education have been very different in the two sectors. Operating costs (defined as educational and general expenditures less institutionally-funded student aid) have grown substantially ahead of inflation in private higher education, with real growth over the decade 1985–86 to 1995–96 totaling 22 percent. In public colleges, by contrast, per student growth in cost has been much slower, totaling only 9 percent in constant dollar terms over the 1985–86 to 1995–96 decade, well under 1 percent per year (NCES 2000).

Sources of inflation in tuition are thus clearly quite different in the two sectors. In private higher education, producers are offering an increasingly expensive product, a result of investments in higher faculty salaries, more lavish facilities and so on. This is a reflection of what

Charles Clotfelter has called the "unbridled aspirations" of universities, and it probably reflects as well a judgment that at the margin students are more attracted by the amenities offered at expensive colleges than they are put off by the higher prices those amenities require.

In public higher education, however, the issue is much less one of rising cost than of a shifting of costs from one set of payers to another. The burden has been shifting from taxpayers to families. Thus, as Table 1 shows, in 1985–86, 61 percent of the revenues of public colleges and universities were provided through appropriations of state and local governments, and tuition payments provided 18 percent of revenues. By 1995–96, state and local government appropriations contributed just 51 percent of revenues, while tuition payments provided 24 percent.

The underlying sources of the decline in state and local government appropriations lie, presumably, in the squeeze on state budgets produced by, on the one hand, pressures to limit taxes and, on the other hand, urgent demands on state government for expenditures on elementary and secondary education, prisons, and health care. In the last few years, many state budgets have moved into surplus, but well-informed studies of state budgeting judge that the squeeze on appropriations for state colleges and universities will be long-lasting (Hovey 1999). In principle, states and higher education institutions could have responded to the budget squeeze by holding tuitions down and making large reductions in costs—allowing class sizes to rise, buildings to deteriorate, and so on. Certainly there has been variance across states in the degree to which this has happened. But it is not surprising on balance that institutions have sought to make up for a large fraction of what was lost in state appropriations through increases in tuition.

For private colleges, cost increases are real and tuition increases have helped finance those cost increases. As Charles Clotfelter's (1996) case study of four, selective private institutions suggests, increases in spending at private colleges have been distributed across a range of spending categories, so it is not easy to identify a single source of cost increases. Whether these investments in a range of higher education inputs have produced a higher quality product is not easy to determine, since measurements of the quality of "output" of colleges and universities are elusive. It is clear that, with high and rising returns to higher education, families who can afford it have been willing to pay the price.

Table 1.—Percent of Higher Education Revenue, by Source, by Sector: Selected Academic Years, 1939-1996

Year	Gross Tuition	Federal	State & Local	Government Gifts & Endowment Earnings	Other
Public Institutions					
1939–40	0.20	0.13	0.61	0.04	0.01
1949–50	0.25	0.13	0.56	0.03	0.03
1955–56	0.13	0.17	0.62	0.04	0.04
1959–60	0.13	0.21	0.59	0.04	0.03
1965–66	0.14	0.23	0.54	0.03	0.05
1969–70	0.15	0.19	0.57	0.03	0.05
1975–76	0.16	0.18	0.61	0.03	0.02
1979–80	0.15	0.16	0.62	0.04	0.03
1985–86	0.18	0.13	0.61	0.05	0.03
1989–90	0.20	0.13	0.58	0.05	0.04
1991–92	0.22	0.14	0.55	0.06	0.03
1992–93	0.24	0.14	0.53	0.06	0.04
1993–94	0.24	0.14	0.52	0.06	0.04
1994–95	0.24	0.14	0.52	0.06	0.04
1995–96	0.24	0.14	0.51	0.06	0.04
Private Institutions					
1939–40	0.55	0.01	0.03	0.38	0.03
1949–50	0.57	0.12	0.04	0.23	0.05
1955–56	0.45	0.18	0.02	0.28	0.06
1959–60	0.43	0.25	0.02	0.25	0.05
1965–66	0.43	0.30	0.02	0.18	0.06
1969–70	0.44	0.26	0.03	0.19	0.08
1975–76	0.48	0.25	0.04	0.19	0.04
1979–80	0.47	0.25	0.04	0.19	0.05
1985–86	0.50	0.22	0.03	0.19	0.06
1989–90	0.51	0.21	0.04	0.18	0.06
1991–92	0.53	0.20	0.04	0.17	0.06
1992–93	0.54	0.19	0.04	0.17	0.06
1993–94	0.55	0.19	0.04	0.17	0.06
1994–95	0.55	0.19	0.03	0.17	0.06
1995–96	0.55	0.17	0.03	0.18	0.07

NOTES: 1995-96 data are preliminary. Figures do not include revenue from auxiliary enterprises or from sales and services. Government figures do not include student aid (which is included under gross tuition). Percent of total revenue figures are the same for current or constant dollars.

SOURCE: See Michael McPherson and Morton Owen Schapiro, 1991, *Keeping College Affordable: Government and Educational Opportunity*, Washington, DC: The Brookings Institution, p. 21, plus, for data after 1986, Table 325 (p. 349) and Table 326 (p. 350) of U.S. Department of Education, National Center for Education Statistics (NCES), 1998, *Digest of Education Statistics 1998*, Washington, DC: U.S. Government Printing Office.

It never made much sense to think that federal spending on student aid grants was an important cause of price increases in private higher education. Most federal grants are directed at relatively low-income individuals, who generally, at private colleges, receive a further institutionally financed grant to help finance their education. In such a case, raising tuition levels would not induce an increase in federal grant support. It is plausible that increases in federal grant awards could reduce institutional grant spending, but a direct link between federal grants and private college tuitions is unlikely. In public higher education, there was a time when tuitions were low enough to imagine that in some states, public institutions might have been able to capture additional federal grant revenues by increasing tuition, thereby enabling their students to qualify for more need-based federal aid.

Empirical work we performed more than a decade ago yielded results consistent with this theoretical analysis. In a multivariate statistical model, we found no significant tendency for private institutions that received more federal student aid grants to have higher tuition, while we did find that increases in federal aid were correlated with higher prices in public institutions.

In any event, federal student aid appropriations over most of the last decade grew more slowly than prices in either sector, so they seem an unlikely cause of price increases in recent years.

Federal student loan volume has, however, grown very rapidly during the 1990s. Some of this growth has come about through easing of the needs analysis applying to federally subsidized student loans. Much of the increase in volume has come about, however, through families choosing to borrow more—either in subsidized or in unsubsidized loans (like PLUS)—under existing rules. From this point of view, it seems more plausible to think of the increase in loan volume more as a result than as an independent cause of price increases. Of course, it is true that had the federal government made access to loans substantially more restrictive, this would have tended to reduce the demand for higher education, and might have retarded price increases.

Changes in Net Price

Changes in sticker price are only part of the story, of course. Fewer than half of all students in private colleges pay the full price and even in public higher education, many students receive aid to help them pay for college costs. The result is that students at the same institution often pay very different prices.

Table 2.—Financing Undergraduate Tuition: 1986–87 and 1995–96

[In 1992–93 dollars]

		Net Tuition	Federal Grant	Federal Loan Subsidy	State Grant	Institutional Grant	Gross Tuition
Private Non-Profit Institutions							
Low Income	86–87	$1,446	$1,658	$999	$1,469	$2,133	$7,704
	95–96	3,530	1,525	1,308	984	3,473	10,821
Middle Income	86–87	4,118	374	879	625	2,151	8,147
	95–96	6,323	136	1,176	503	3,830	11,967
High Income	86–87	7,616	130	334	93	977	9,151
	95–96	11,098	13	593	88	1,738	13,530
Public Institutions							
Low Income	86–87	-512	1,074	403	415	277	1,658
	95–96	-143	1,087	691	505	539	2,679
Middle Income	86–87	1,076	107	310	116	259	1,868
	95–96	1,731	71	569	156	332	2,859
High Income	86–87	1,864	36	83	19	138	2,140
	95–96	3,155	3	307	56	209	3,730
Private For-Profit Institutions (Proprietary Schools)							
Low Income	86–87	1,950	1,674	1,311	330	202	5,468
	95–96	3,539	1,414	1,328	291	131	6,702
Middle Income	86–87	4,008	168	1,363	246	214	6,000
	95–96	5,193	122	1,445	141	125	7,026
High Income	86–87	5,495	51	408	10	121	6,085
	95–96	6,408	0	729	0	69	7,206

NOTES: Numbers are averages across all full-time, dependent students attending a particular institutional type. Federal loan subsidies are computed at 50% of loan amounts (excluding PLUS). Income brackets (adjusted to constant 1992-93 dollars): for 1986-87, less than $23,500 (low), $23,500 to $54,900 (middle), greater than $54,900 (high); for 1995-96, less than $32,600 (low), $32,600 to $76,200 (middle), greater than $76,200 (high).

SOURCE: Calculated from U.S. Department of Education, National Center for Education Statistics (NCES), National Post-secondary Student Aid Study (NPSAS), 1986-87 and 1995-96, Undergraduate Data Analysis System.

Table 2 summarizes evidence from other work we have done on the net prices faced by students in different years, sectors, and income groups. The top panel of Table 2 presents information on the distribution of gross tuition costs (in 1992–93 dollars) for full-time, dependent students attending private, non-profit colleges and universities. Students are divided into low, middle, and high income groups. Income brackets, described at the bottom of the table, were adjusted to constant 1992–93 dollars; the differences in cut-points for 1986–87 and 1995–96 reflect price increases of 38.7 percent over this period.[1]

At private non-profit colleges and universities, there was a considerable real increase in gross tuition charges (sticker prices) facing students from all income backgrounds, with the largest absolute increase for high-income students. However, increases in the net tuition price actually paid by students were somewhat smaller than increases in sticker prices: $3,482 versus $4,379 for high-income students, $2,205 versus $3,820 for middle-income students, and $2,084 versus $3,117 for low-income students.

Federal grants fell in real value for all three income groups, although they account for only a small percentage of gross tuition for students from middle- and high-income backgrounds. For students from low-income backgrounds, the decline in the real value of federal grants, along with the considerable real increase in gross tuition, means that the percentage of tuition covered by federal grant aid has decreased considerably over time—from 22 percent in 1986–87 to only 14 percent in 1995–96.

The subsidy value of federal loans—computed at 50 percent of the total loan amount—increased for all income groups, reflecting the substantial increase in loans noted earlier (McPherson and Schapiro 1991). State grants not only contribute a decreasing share of gross tuition, they have declined significantly in absolute terms for low-income students (for whom the real value of state grants fell by $485).

Institutional grants, on the other hand, have increased rapidly for students from all income backgrounds, with the largest absolute increase going to middle-income students. The percentage contribution of institutional grants to gross tuition has increased from 28 percent to 32 percent for low-income students, from 26 percent to 32 percent for middle-income students, and from 11 percent to 13 percent for high-income students.

The middle panel provides analogous information for students attending public colleges and universities. As for private institutions, sticker prices increased in real terms for all groups.

[1]Owing to minor changes in methodology and data definitions, the data for 1986-87 reported here differ slightly from those presented in McPherson and Schapiro (1998).

Again, increases in the net tuition price actually paid by students were somewhat smaller than increases in sticker prices for each income group—$1,291 versus $1,590 for high-income students, $655 versus $991 for middle-income students, and $369 versus $1,021 for low-income students. Note that for the average low-income student attending a public institution, the contribution of federal, state, and institutional aid exceeded the gross tuition price in both years once the subsidy value of federal loans is included as part of financial aid. This reflects the difference between gross tuition and gross total costs of attendance, with the latter including room, board, and other charges. Thus, the excess of financial aid over gross tuition is applied against other costs of attendance.

Federal grants for low-income students attending public colleges and universities were roughly stable, but the percentage of gross tuition covered by federal grant aid decreased from 65 percent in 1986–87 to only 41 percent in 1995–96. The subsidy value of federal loans, on the other hand, increased in real terms for students from all income backgrounds, as did the real value of state grants. Institutional grants also increased for students from all income groups.

Finally, the bottom panel presents information for students attending private for-profit (proprietary) schools. Again, sticker prices increased in real terms for all groups, although in this case increases in the net tuition price actually paid by students were about equal to or were larger than increases in sticker prices for each income group—$913 versus $1,121 for high-income students, $1,185 versus $1,026 for middle-income students, and $1,589 versus $1,234 for low-income students. This reflects the decline in the real value of financial aid from various sources.

At least two important lessons follow from this analysis. First, an exclusive focus on sticker prices misses much of the action in higher education pricing. The net prices faced by students are, on average, substantially below the sticker price. Gauging affordability of higher education without attending to the discounts provided by institutions and the aid provided through governments can be quite misleading. Second, however, it is clear that financial aid has not changed in such a way as to offset the real increases in sticker price discussed in the preceding section, even for low-income students.

The question of trends in net prices facing students from different income groups is important for policy purposes. As we have argued extensively in other work, there is substantial evidence that the enrollment decisions of students from low-income families are much more sensitive to price than are those of other students. There is also evidence that enrollment rates for low-income students, even among those who are strong performers in high school, lag behind those for other students.

Future Analyses

We have several observations and suggestions to advance concerning future research.

Analysis of Tax Credits

The impact of the college tuition tax credits recently introduced by the federal government has received almost no systematic analysis. As noted earlier, there is little evidence—and little theoretical reason to suppose—that federal student aid increases have contributed to tuition inflation. But the tax credits may have a different impact. Public institutions have an incentive under the Hope credit to make sure their tuition is high enough to enable students who otherwise qualify to take the full credit. More important, the Lifetime Learning Credit applies to part-time as well as full-time enrollment. This credit, in effect, provides a twenty percent federal government "match" for all tuition payments under $5,000 for eligible taxpayers. (The ceiling would double to $10,000 under a current proposal from the White House.) This marginal subsidy for part-time tuition could easily be enough to induce tuition increases, especially in programs that recruit a large fraction of students who qualify for the credit. As the tax credits come into full flower, these theoretical possibilities deserve empirical study.

One would expect that there should also be some effort to determine whether these tax credits have any impact on whether or where students attend college. Most informed observers have been skeptical about such effects, at least among dependent students, since the tax credits are generally not available to low-income families with dependent students, and those are the families for whom price responsiveness is expected to be greatest. Yet since the credits have been defended in part as a way of helping make college more affordable, it is reasonable to look to see whether there are any behavioral effects. There may also be observable effects on independent students.

To make such analysis possible, it is very important that federally supported data bases, both longitudinal databases like the National Education Longitudinal Study of 1988 (NELS:88) and the National Postsecondary Student Aid Study (NPSAS), capture adequate tax information.

Tracking and Explaining Patterns of Cost, Price, and Subsidy

The National Commission on the Cost of Higher Education did a great service by underscoring the need to distinguish among cost, price, and subsidy in analyzing higher education finance. We would underscore also the importance of distinguishing net price and gross price, as well as tracking the subsidies facing families in differing socio-economic circumstances.

NACUBO's project to measure institutional costs more adequately, along with federal government efforts to improve the quality of the IPEDS database, are relevant here.

Integrating such improved analyses with the data on individuals provided in NPSAS and other sample databases will allow for a more adequate picture of how much folks in different circumstances pay, and how much their educational investments are subsidized.

More work is also needed on both theoretical and empirical explanations of observed patterns and trends in cost, price, and subsidy. Most suppliers of higher education services are either private, non-profit or governmentally operated. Theories of supply behavior for such enterprises are not well developed. We can cite two simple examples. First, we need more work on explaining how institutional pricing and aid decisions respond to changes in external subsidies.[2] Second, the net effect that cooperative agreements among universities concerning student aid award practices have on prices facing different groups of students is not well understood.

Measuring Effects of Higher Education

Although the focus of the present paper is on the price and cost of higher education, ultimately we need to be interested in the relation between the cost side and the benefits of higher education.

Not all the benefits of higher education accrue to identifiable individuals, but many of them do. These benefits to individuals are both economic and non-economic, and they accrue over a lifetime. The longitudinal surveys the Department of Education has mounted, beginning with National Longitudinal Survey of 1972 (NLS-72) and continuing with High School and Beyond (HS&B) and NELS:88, are tremendously valuable resources for research into the effects of higher education on individuals.

It is discouraging that budget constraints have imposed severe limits on follow-ups to these surveys. In the inescapable struggle over resources, it is understandable that learning more about folks who graduated from high school in the very different world of 1972 or 1980 may seem less urgent than investing in the study of current graduates. Yet we should see these studies over the entire life cycle as important long run investments in our knowledge of the social world. Following several cohorts of high school graduates through their remaining schooling and then through their careers would provide an immensely valuable resource for the social scientists of the twenty-first century.

[2]Some work on these lines is reported in McPherson and Schapiro (1991, 1998).

We would also endorse the argument that has been effectively advanced by Tom Kane in favor of federal government investment in systematic experiments on the impact of student aid on college enrollment. The problems of developing reliable econometric estimates of the impact of student aid grants and loans on college enrollment are considerable. One key obstacle is that grant and loan awards are not random "treatments," but instead vary with the characteristics of students and institutions. The resulting statistical confounding is very hard to tease out. Even when that work is done well, it is very difficult to summarize results in a way that will be accessible and persuasive to busy policymakers and elected officials. Experiments are simpler to understand and require less statistical apparatus in explaining results.

Conclusion

What holds together the various points we have made? To us, the key point is the need to focus resources on questions of real significance. Far too much discussion of cost and price issues in higher education ignores simple but important facts—like the fact that most people don't pay the sticker price, and the fact that the relation between costs and prices is very different in public and private higher education. Equally important is the need to be clear about the goals of policy in doing effective policy-oriented research. If, for example, a central goal of policy is to use scarce dollars to increase college enrollments, then research on the relative responsiveness of different groups' enrollment decisions to price changes is critical. If, in contrast, a main goal is simply to reduce the out-of-pocket expenses facing families with children in college, without regard to whether their college decisions are affected by price changes, then the research agenda becomes quite different. Clarity about major institutional facts and about major policy purposes is important to the development of effective research.

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Measuring Higher Education Costs: Considerations and Cautions

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In 1997, Congress passed Public Law 105-18 (Title IV, Cost of Higher Education Review), which created the National Commission on the Cost of Higher Education. This commission was charged with responsibility for advising Congress on the underlying cause of decade-long upward spiraling tuition rates at colleges and universities throughout the United States. The Commission was to review real and potential cost drivers including faculty and administrative compensation, faculty workloads, capital costs including the introduction of new technologies, and financial aid expenditures. The Report of the National Commission, *Straight Talk About College Costs and Prices*, was delivered to Congress in January of 1998. The document described the complex interrelationship between and among the cost drivers cited above. The Commission's Report subsequently led to a Congressionally mandated national study of college costs that was to have been carried out by the National Center for Education Statistics (NCES), beginning in 1999.

The Statement of Work promulgated by NCES called for an examination of cost drivers that would focus on:

- Faculty salaries and benefits
- Administrative salaries and benefits
- Academic support services
- Research expenditures
- Cost of technology
- Cost of constructing/replacing instructional facilities

Moreover, the study was expected to examine the relationship of expenditures to the price charged for a college education, and the relationship of financial aid and tuition discounting to tuition rates.

Congress did not provide funding for the study, and after a series of fitful starts, the project was put on hold. At the same time, however, the National Association of College and University Business Officers (NACUBO) initiated its own national study of college costs. While methodol-

ogically quite different from the NCES effort—NACUBO hoped to focus on undergraduate costs and included a mechanism for allocating administrative, operational, and capital costs—the overall conceptual objective was similar to that of NCES, i.e., a single, "industry-wide" model that would describe the full cost of higher education at the institutional level of analysis.

This paper will argue that, while well intentioned, these "one-size-fits-all" approaches to cost analysis raise more questions than they answer. Perhaps most significant is the fact that they fail to acknowledge that differences in institutional mission, and in the mix of disciplines that constitute an institution's curriculum, have very real and profound effects on the cost of higher education.

The National Study of Instructional Costs and Productivity, more commonly referred to as the Delaware Study, begun in 1992, takes a decidedly different approach to cost analysis than either the NCES or NACUBO methodologies. Specifically,

- It is predicated on the assumption that there is a relationship between the magnitude of faculty teaching loads—particularly those of tenured and tenure-track faculty—and the direct cost of instruction, and that within this relationship, costs vary significantly across disciplines.
- The relationship between teaching loads and costs is further mitigated by the mission of an institution, i.e., the relative emphasis it places on teaching, research, and public service.
- The discussion of cost measurement is best served by initially focusing on direct expenditures, the definitions for which are broadly accepted and consistent across all institutions. Measures of indirect costs are far more nebulous and inconsistent.

As mentioned, the Delaware Study was begun in 1992, and its evolution is fully described in an Institute for Higher Education Policy publication, *Higher Education Cost Management: Public Policy Issues, Options, and Strategies* (Middaugh 2000a). This paper will describe what has been learned from Delaware Study data, and the implication of those findings for understanding the drivers of higher education costs.

The relationship between teaching loads, costs, and institutional mission is best described in the following manner. Research universities have complex institutional missions which require that faculty spend significant blocks of time engaged in research and public service activity, as well as instructional activity. Doctoral universities have a somewhat reduced emphasis on public service, but the presence of a broad spectrum of graduate education at those institutions necessitates emphasis on research activity. Comprehensive institutions, with only minimal graduate education, and baccalaureate institutions with no graduate education at all, are free to focus primarily on teaching activity. It therefore might be assumed that research and doctoral

universities will incur additional instructional costs related to the need to supplement time that regular faculty spend in research or public service activity. Therefore, one would expect to find faculty at research universities teaching lighter loads at higher costs than faculty at doctoral universities, who in turn, would teach lighter loads at higher costs than faculty at either comprehensive or baccalaureate institutions.

The Delaware Study is uniquely structured to test these hypotheses. The Study's data collection form, found in figure 1, contains the essential data elements. Part A of the data collection form is a detailed matrix that collects data that enables a response to the question, "Who is teaching what to whom?" The Delaware Study has consistently yielded data over the years that indicate that 85 to 90 percent of direct instructional costs are personnel costs. Since tenured and tenure track faculty constitute "fixed costs," i.e., tenure provides a lifetime promise of employment that can only be altered by death, retirement, or resignation, any reasonable cost analysis will seek data on return on investment. That is, what do tenure track faculty do in the way of teaching, research, and service? Similarly, the argument has been made in many quarters that part time and non-tenure-track faculty are increasingly being used as a cost reduction strategy to teach undergraduates while leaving more expensive tenured faculty to pursue graduate teaching and their own research interests. The Delaware Study data collection form enables responses to these issues.

While the Delaware Study generates benchmark data for virtually any discipline except medical education, experience suggests that in analyzing data for purposes of national discussions, it is best to focus in disciplines typically found at most colleges and universities, regardless of Carnegie classification. Those analyses focus on the following disciplines:

Communications
Computer and Information Science
Education
Engineering
Geological Sciences
Foreign Languages and Literature
English Language and Literature
Biological Sciences
Mathematics
Philosophy
Chemistry
Accounting
Psychology
Anthropology
Economics
Geography
Physics
History
Political Science and Government
Sociology
Visual and Performing Arts
Nursing
Business/Admin. Management
Financial Management Services

Figure 1.—1999 Delaware Study of Instructional Cost and Productivity

Institution:

Department/ Discipline:

Associated CIP Identifier:

Please indicate the average number of degrees awarded in this discipline at each degree level over the three-year period from 1994-95 through 1996-97.

Bachelor's:

Master's:

Doctorate:

Professional:

Place an 'X' in the box below if this discipline is non-degree granting.

☐ Semester

☐ Quarter

A. INSTRUCTIONAL COURSELOAD: FALL SEMESTER, 1997

Please complete the following matrix, displaying student credit hours and organized class sections taught, by type of faculty, and by level of instruction. Be sure to consult definitions before proceeding. Do not input data in shaded cells except for those mentioned in the important note below that pertains to (G) and (J).

Faculty				Student Credit Hours								Organized Class Sections				
	FTE Faculty			(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	Other Section Types (Lecture, Seminar, etc.)			
Classification	(A) Total	(B) Separately Budgeted	(C) Instructional	Lower Div. OC*	Upper Div. OC*	Undergrad Indiv. Instruct.	Total Undergrad SCH	Grad OC*	Graduate Indiv. Instruct.	Total Graduate SCH	Total Student Credit Hours	Lab/ Dsc/ Rec. Sections	(M) Lower Div.	(N) Upper Div.	(O) Graduate	(P) Total
Regular faculty: Tenured/Tenure Eligible																
Other Regular Faculty																
Supplemental Faculty		NA														
Teaching Assistants: Credit Bearing Courses		NA														
Non-Credit Bearing Activity		NA		NA	NA	NA	NA	NA	NA	NA	NA					
TOTAL																

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Figure 1.—1999 Delaware Study of Instructional Cost and Productivity—Continued

In the box to the right, indicate the number of Graduate Individualized Instruction Student Credit Hours from the Total that are devoted to supervised doctoral dissertation. [ ]

B. COST DATA: ACADEMIC AND FISCAL YEAR 1997-98

1. In the boxes below, enter the total number of student credit hours that were generated during Academic Year 1997-98 during terms that were supported by the department's instructional budget. (NOTE: Semester calendar institutions will typically report fall and spring student credit hours; quarter calendar institutions will usually report fall, winter, and spring student credit hours.)

[ ] A. Undergraduate

[ ] B. Graduate

2. In the boxes below, enter total ***direct*** expenditures for instruction in FY 1997-98.

[ ] A. Salaries

[ ] B. Benefits

[ ] C. Other than personnel expenditures.

[ ] D. Total

Are the benefits included in the number reported for salaries (Y/N)? [ ]

If the dollar value is not available, what percent of salary do benefits constitute at your institution? [ ]

3. In the box below, enter total ***direct*** expenditures for separately budgeted research activity in FY 1997-98.

[ ]

4. In the box below, enter total ***direct*** expenditures for separately budgeted public service activity in FY 1997-98.

[ ]

Figure 2 gives the reader a sense of the capabilities of Delaware Study data. In this instance, the benchmarks reflect teaching activity for tenured and tenure track faculty as reflected in the 1997–98 data collection cycle. The data examine average teaching loads, by Carnegie institution type, for the following variables:

Undergraduate student credit hours taught/FTE faculty (UG SCH)

Undergraduate class sections taught/FTE faculty (UG OC sections)

Graduate student credit hours taught/FTE faculty (GR SCH)

Graduate class sections taught/FTE faculty (GR OC sections)

Total student credit hours taught/FTE faculty (Total SCH)

Total class sections taught/FTE faculty (Total OC sections)[1]

The data yield some interesting results:

- Across the 24 disciplines, the vast majority of student credit hours and organized class sections taught by tenured and tenure track faculty are at the undergraduate level—even at research and doctoral universities.
- As expected, faculty at comprehensive institutions generally teach heavier loads than faculty at research and doctoral universities, where there are clear expectations for faculty activity other than teaching.
- Baccalaureate institutions clearly display some anomalies with respect to teaching loads, frequently displaying loads lighter than those for either research or doctoral faculties. When the pool of participating baccalaureate institutions was examined, they turned out to be largely highly selective liberal arts colleges, which consciously opt for smaller class sizes as a characteristic of their instructional delivery mode. These patterns are reflected in the cost of education at those institutions.

[1] For these variables, the following abbreviations are used: FTE for full-time equivalent; UG for undergraduate; SCH for student credit hour; OC for organized class sections; and GR for graduate students.

Figure 2.—Normative number of student credit hours, organized class sections, and FTE students taught per term per FTE instructional faculty, by Carnegie classification: 1998

Discipline/ CIP Carnegie Classification	N	UG SCH	UG OC Sections (Exc. Lab)	GR SCH	GR OC Sections (Exc. Lab)	Total SCH	Total OC Sections (Exc. Lab)	Total OC Sections (Inc. Lab)	FTE Students Taught
9.00 COMMUNICATIONS									
Research	73	204	1.8	25	0.6	227	2.4	2.6	16.2
Doctoral	25	207	2.1	24	0.7	225	2.7	2.8	16.2
Comprehensive	59	211	3.3	17	0.4	217	3.6	3.7	15.0
Baccalaureate	8	165	3.4	na	na	165	3.4	3.4	11.0
11.00 COMPUTER AND INFORMATION SCIENCES									
Research	43	159	1.1	54	0.8	204	1.8	2.1	16.3
Doctoral	22	143	1.6	44	0.8	189	2.3	2.4	14.6
Comprehensive	40	209	3.2	26	0.7	227	3.5	3.8	15.9
Baccalaureate	8	228	3.7	na	na	228	3.7	3.9	15.2
13.00 EDUCATION									
Research	156	79	0.9	73	1.4	151	2.3	2.5	13.4
Doctoral	71	93	1.2	69	1.6	157	2.9	3.1	14.0
Comprehensive	145	132	2.1	54	1.2	182	3.3	3.6	14.7
Baccalaureate	18	203	3.4	12	0.6	214	3.9	4.1	14.8
14.00 ENGINEERING									
Research	290	104	1.3	36	0.7	144	2.0	2.6	11.2
Doctoral	74	106	1.5	23	0.7	129	2.2	2.6	9.7
Comprehensive	50	132	2.2	15	0.6	141	2.7	3.4	9.8
16.00 FOREIGN LANGUAGES AND LITERATURES									
Research	141	115	1.8	17	0.6	132	2.4	2.5	9.7
Doctoral	32	134	2.2	14	0.4	139	2.6	2.7	9.7
Comprehensive	54	181	3.6	11	0.4	182	3.7	3.7	12.2
Baccalaureate	18	160	3.3	na	na	160	3.3	3.2	10.6
23.00ENGLISH LANGUAGE AND LITERATURE									
Research	76	135	1.5	24	0.5	168	2.0	2.1	12.3
Doctoral	32	136	1.7	23	0.6	160	2.4	2.5	11.7
Comprehensive	69	217	3.2	9	0.4	223	3.4	3.4	15.1
Baccalaureate	15	191	3.2	6	0.1	192	3.2	3.4	12.8
26.00 BIOLOGICAL SCIENCES/LIFE SCIENCES									
Research	141	195	1.1	38	0.6	238	1.7	2.4	17.8
Doctoral	29	219	1.6	20	0.7	247	2.2	3.0	17.4
Comprehensive	62	254	2.6	11	0.5	263	2.9	4.2	17.7
Baccalaureate	14	217	2.6	4	0.1	217	2.6	4.4	14.5

Figure 2.—Normative number of student credit hours, organized class sections, and FTE students taught per term per FTE instructional faculty, by Carnegie classification: 1998—Continued

CIP	Discipline/ Carnegie Classification	N	UG SCH	UG OC Sections (Exc. Lab)	GR SCH	GR OC Sections (Exc. Lab)	Total SCH	Total OC Sections (Exc. Lab)	Total OC Sections (Inc. Lab)	FTE Students Taught
27.00	MATHEMATICS									
	Research	75	176	1.3	30	0.7	212	2.0	2.2	15.7
	Doctoral	28	195	1.8	16	0.5	214	2.3	2.4	15.1
	Comprehensive	56	243	3.3	7	0.3	248	3.4	3.5	16.7
	Baccalaureate	11	252	3.2	na	na	252	3.2	3.5	16.8
38.01	Philosophy									
	Research	49	224	1.8	16	0.4	238	2.2	2.3	16.5
	Doctoral	24	221	2.4	12	0.5	230	2.6	2.6	15.7
	Comprehensive	29	282	3.3	9	0.1	283	3.3	3.4	18.9
	Baccalaureate	8	202	3.1	na	na	202	3.1	3.1	13.5
40.05	Chemistry									
	Research	50	261	1.1	35	0.6	299	1.8	2.4	21.2
	Doctoral	25	223	1.3	19	0.5	242	2.1	2.6	17.0
	Comprehensive	47	211	2.3	9	0.4	215	2.6	3.8	14.5
	Baccalaureate	9	183	2.5	na	na	184	2.6	3.9	12.3
40.06	Geological and Related Sciences									
	Research	45	217	1.5	19	0.6	237	2.1	2.5	16.7
	Doctoral	18	205	1.6	16	0.6	220	2.5	3.0	15.3
	Comprehensive	22	206	2.5	6	0.3	210	2.7	3.9	14.2
40.08	Physics									
	Research	49	188	1.1	17	0.4	198	1.6	2.2	13.9
	Doctoral	25	171	1.5	11	0.5	183	2.0	2.7	12.7
	Comprehensive	42	198	2.6	6	0.5	200	2.7	3.8	13.7
	Baccalaureate	6	126	2.6	na	na	127	2.6	3.5	8.5
42.00	PSYCHOLOGY									
	Research	52	258	1.2	31	0.7	283	1.9	2.0	20.6
	Doctoral	28	202	1.4	38	1.0	222	2.1	2.5	16.3
	Comprehensive	62	254	2.8	34	1.1	271	3.4	3.6	19.2
	Baccalaureate	11	272	2.8	na	na	278	2.8	3.8	18.8
45.02	Anthropology									
	Research	38	220	1.6	27	0.6	246	2.2	2.3	17.6
	Doctoral	16	221	1.6	26	0.7	242	2.3	2.4	17.1
	Comprehensive	14	289	3.3	22	0.9	297	3.5	3.5	20.2
45.06	Economics									
	Research	41	239	1.3	29	0.6	268	1.9	2.0	19.2
	Doctoral	17	212	1.6	23	0.8	232	2.3	2.3	16.4
	Comprehensive	24	292	3.2	16	0.4	304	3.5	3.4	20.8
	Baccalaureate	6	190	3.3	na	na	192	3.3	3.3	12.9

Figure 2.—Normative number of student credit hours, organized class sections, and FTE students taught per term per FTE instructional faculty, by Carnegie classification: 1998—Continued

CIP	Discipline/ Carnegie Classification	N	UG SCH	UG OC Sections (Exc. Lab)	GR SCH	GR OC Sections (Exc. Lab)	Total SCH	Total OC Sections (Exc. Lab)	Total OC Sections (Inc. Lab)	FTE Students Taught
45.07	Geography									
	Research	33	247	1.7	25	0.5	271	2.2	2.4	19.1
	Doctoral	11	284	2.1	24	0.8	304	2.7	2.8	21.1
	Comprehensive	18	312	3.2	15	0.6	322	3.5	3.9	21.9
45.08	History									
	Research	51	234	1.7	21	0.4	258	2.2	2.3	18.1
	Doctoral	24	223	2.1	19	0.7	242	2.7	2.7	16.9
	Comprehensive	50	258	3.2	11	0.4	263	3.4	3.5	17.7
	Baccalaureate	9	185	3.2	na	na	187	3.2	3.3	12.5
45.10	Political Science and Government									
	Research	50	191	1.4	22	0.6	214	2.0	2.1	15.3
	Doctoral	22	162	1.8	25	0.7	187	2.5	2.5	13.5
	Comprehensive	42	224	3.2	15	0.5	232	3.4	3.4	16.3
	Baccalaureate	7	194	2.9	na	na	196	2.9	3.0	13.1
45.11	Sociology									
	Research	49	282	1.6	22	0.5	298	2.2	2.4	20.8
	Doctoral	21	245	2.0	21	0.6	255	2.5	2.6	17.8
	Comprehensive	43	297	3.3	11	0.4	300	3.4	3.4	20.1
	Baccalaureate	8	242	3.2	3	0.1	243	3.3	3.4	16.3
50.00	VISUAL AND PERFORMING ARTS									
	Research	159	138	1.9	16	0.6	153	2.4	3.0	10.8
	Doctoral	68	131	2.2	14	0.6	145	2.8	3.7	10.3
	Comprehensive	147	152	3.5	5	0.3	154	3.6	4.1	10.5
	Baccalaureate	27	118	3.7	na	na	118	3.7	3.6	7.9
51.16	Nursing									
	Research	30	88	0.8	37	0.8	123	1.6	2.0	9.8
	Doctoral	19	89	1.1	45	0.7	124	1.7	2.0	9.9
	Comprehensive	33	112	1.6	17	0.5	121	2.1	2.6	8.6
52.02	Business Administration and Management									
	Research	32	192	1.3	73	0.9	265	2.2	2.2	20.6
	Doctoral	15	213	2.1	41	0.6	249	2.5	2.7	18.5
	Comprehensive	40	212	2.5	36	0.7	235	3.1	3.2	17.4
	Baccalaureate	5	178	4.1	na	na	178	4.1	4.1	11.9
52.03	Accounting									
	Research	35	175	1.4	46	0.6	227	2.0	2.2	17.5
	Doctoral	15	158	1.7	50	0.7	207	2.4	2.5	15.3
	Comprehensive	43	218	2.6	19	0.4	239	3.0	3.1	16.7
52.08	Financial Management and Services									
	Research	29	184	1.3	53	0.8	234	2.1	2.1	17.9
	Doctoral	11	205	1.9	35	0.6	239	2.4	2.4	18.4
	Comprehensive	21	229	2.7	31	0.6	250	3.1	3.1	17.5

In a recent book (Middaugh 2000b), four cycles of Delaware Study data are analyzed, yielding the following results:

- On average, across the 24 disciplines examined, the proportion of undergraduate student credit hours taught by tenured and tenure track faculty was 62.4 percent at research universities, 63.4 percent at doctoral universities, 74.8 percent at comprehensive institutions, and 79.6 percent at baccalaureate colleges.
- On average across the disciplines, the proportion of organized class sections (including zero-credit laboratory, recitation, and discussion sections) taught by tenured and tenure track faculty was 60.3 percent at research universities, 63.4 percent at doctoral universities, 75.1 percent at comprehensive institutions, and 76.8 percent at baccalaureate institutions.

These data clearly suggest that tenured and tenure track faculty, in whom an institution has the greatest investment, are in fact teaching. The proportion of student credit hours and organized class sections taught by tenured and tenure track faculty is largest at comprehensive and baccalaureate institutions, where teaching is the primary mission. It is remarkable, however, that on average across the disciplines, nearly two of every three undergraduate student credit hours and organized class sections at Research and Doctoral Universities are generated by tenured and tenure track faculty, despite the fact that they are expected to also teach graduate courses and engage in significant research and service activity. The notion that college costs have escalated because high-priced tenured and tenure-track faculty rarely teach and must be replaced by non-tenured and part-time faculty is simply not supported by the data.

The data analysis in figure 2 is routinely repeated for regular non-tenure track faculty, supplemental/adjunct faculty, and graduate teaching assistants in generating annual Delaware Study benchmarks.

Figure 3 marries the teaching load data from the Delaware Study with direct expenditure data provided by participating institutions (as does Figure 4, at the end of this paper). Again, benchmarks for each of the 24 disciplines are provided for the following variables:

Direct instructional expense/student credit hour taught (Direct exp. per SCH)
Direct instructional expense/FTE student taught (Direct exp. per FTE student)
Personnel cost as % of instructional expense (Personnel as % of direct instr. exp.)
Sponsored activity/FTE tenured-tenure track faculty (Res. + Service/T-TT faculty)[2]

[2] For these variables, the following abbreviations are used: SCH for student credit hour; FTE for full-time equivalent; T-TT for tenured or tenure track; exp. for expenditure; and Res. for research.

Figure 3.—Normative instructional cost ratios, research and public service expenditures, by Carnegie classification: Fiscal Year 1997–98

Discipline/ CIPCarnegie Classification	N	Direct Exp. per SCH	Direct Exp. Per FTE Student	Personnel of Direct Instr. Exp.	Research FTE T-TT Faculty	Service FTE T-TT Faculty	Res. + Service FTE T-TT Faculty
9.00 COMMUNICATIONS							
Research	51	157	4,676	92	2,282	941	2,984
Doctoral	23	132	3,872	91	295	225	553
Comprehensive	52	127	3,755	95	119	0	137
Baccalaureate	8	118	3,544	92	na	na	na
11.00 COMPUTER AND INFORMATION SCIENCES							
Research	32	170	5,156	90	54,992	615	55,981
Doctoral	20	141	4,196	89	19,052	552	21,764
Comprehensive	34	119	3,626	94	1,035	0	423
Baccalaureate	7	203	6,091	92	na	na	na
13.00 EDUCATION							
Research	116	235	5,619	92	15,230	7,364	30,699
Doctoral	65	167	4,105	93	8,697	2,687	13,336
Comprehensive	135	143	3,775	95	-186	366	917
Baccalaureate	18	156	4,333	87	0	0	0
14.00 ENGINEERING							
Research	215	395	10,748	89	84,441	3,512	92,662
Doctoral	65	332	9,252	88	53,815	997	55,472
Comprehensive	48	282	8,485	94	12,115	0	4,269
16.00 FOREIGN LANGUAGES AND LITERATURES							
Research	83	165	5,037	96	1,618	44	1,603
Doctoral	29	124	3,724	94	702	10	831
Comprehensive	48	141	4,192	97	6	13	20
Baccalaureate	16	186	5,563	97	na	na	na
23.00 ENGLISH LANGUAGE AND LITERATURE/LETTERS							
Research	54	122	3,770	96	462	86	778
Doctoral	30	111	3,417	95	389	202	919
Comprehensive	62	100	3,065	97	127	17	167
Baccalaureate	14	135	4,058	96	na	na	na
26.00 BIOLOGICAL SCIENCES/LIFE SCIENCES							
Research	99	261	7,274	90	113,861	2,544	119,427
Doctoral	24	167	4,692	87	35,065	327	36,148
Comprehensive	56	121	3,714	91	3,401	1	4,328
Baccalaureate	13	151	4,507	87	na	na	na
27.00 MATHEMATICS							
Research	56	144	4,116	94	15,746	237	15,248
Doctoral	26	113	3,443	95	7,103	190	7,411
Comprehensive	49	105	3,162	97	1,003	0	769
Baccalaureate	10	97	2,921	95	na	na	na
38.01 Philosophy							
Research	36	123	3,736	96	1,373	134	1,381
Doctoral	22	136	4,087	95	1,158	249	1,803
Comprehensive	26	95	3,033	98	36	0	46
Baccalaureate	7	146	4,389	98	na	na	na

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Figure 3.—Normative instructional cost ratios, research and public service expenditures, by Carnegie classification: Fiscal Year 1997–98—Continued

Discipline/ CIPCarnegie Classification	N	Direct Exp per SCH	Direct Exp Per FTE Student	Personnel of Direct Instr Exp	Research FTE T-TT Faculty	Service FTE T-TT Faculty	Res. + Service FTE T-TT Faculty
40.05 Chemistry							
Research	37	205	6,130	89	104,226	350	103,867
Doctoral	23	197	5,511	87	52,562	479	53,674
Comprehensive	42	157	4,730	92	4,096	58	3,287
Baccalaureate	8	189	5,639	92	na	na	na
40.06 Geological and Related Sciences							
Research	34	208	6,340	90	46,344	766	49,062
Doctoral	16	159	4,804	91	23,446	118	24,422
Comprehensive	21	137	4,526	93	1,609	0	1,572
40.08 Physics							
Research	36	249	7,493	91	83,938	502	85,210
Doctoral	23	178	5,385	90	33,085	22	33,107
Comprehensive	38	160	4,962	94	4,878	18	3,154
Baccalaureate	5	235	7,047	91	na	na	na
42.00 PSYCHOLOGY							
Research	38	131	4,043	93	35,438	919	35,781
Doctoral	26	124	3,566	93	12,482	1,842	19,202
Comprehensive	54	101	2,834	96	223	0	277
Baccalaureate	10	126	3,721	95	na	na	na
45.02 Anthropology							
Research	26	139	4,109	94	10,621	890	12,491
Doctoral	14	118	3,967	95	14,664	1,295	15,959
Comprehensive	12	105	3,133	97	432	0	432
45.06 Economics							
Research	30	134	4,080	95	5,621	1,558	7,274
Doctoral	15	142	4,167	95	1,707	295	3,094
Comprehensive	22	102	3,238	98	13	6	32
Baccalaureate	5	162	4,864	98	na	na	na
45.07 Geography							
Research	23	140	4,229	91	31,417	2,237	38,242
Doctoral	10	119	3,530	92	9,181	1,388	12,043
Comprehensive	18	94	2,925	94	325	32	422
45.08 History							
Research	38	129	3,964	96	1,285	250	1,624
Doctoral	22	139	3,922	96	1,638	312	2,309
Comprehensive	45	106	3,121	98	221	3	280
Baccalaureate	8	108	3,236	97	na	na	na
45.10 Political Science and Government							
Research	37	160	4,777	94	3,686	699	5,274
Doctoral	20	172	4,849	95	2,766	448	5,651
Comprehensive	37	121	3,582	97	23	0	142
Baccalaureate	6	160	4,795	97	na	na	na
45.11 Sociology							
Research	36	108	3,254	95	13,123	830	15,621
Doctoral	19	122	3,598	95	5,716	354	6,374
Comprehensive	39	96	2,751	97	233	0	77
Baccalaureate	7	130	3,773	98	na	na	na

Figure 3.—Normative instructional cost ratios, research and public service expenditures, by Carnegie classification: Fiscal Year 1997–98—Continued

Discipline/ CIPCarnegie Classification	N	Direct Exp. per SCH	Direct Exp. Per FTE Student	Personnel of Direct Instr. Exp.	Research FTE T-TT Faculty	Service FTE T-TT Faculty	Res. + Service FTE T-TT Faculty
50.00 VISUAL AND PERFORMING ARTS							
Research	117	205	6,179	92	485	563	1,356
Doctoral	62	193	5,793	90	252	1,345	1,916
Comprehensive	134	175	5,385	93	83	71	168
Baccalaureate	24	207	6,211	91	0	0	0
51.16 Nursing							
Research	21	300	8,806	91	18,953	6,723	28,587
Doctoral	17	270	7,588	90	7,044	2,081	11,251
Comprehensive	28	249	7,539	93	369	0	489
52.02 Business Administration and Management							
Research	26	153	4,146	95	2,699	386	4,606
Doctoral	14	136	3,937	95	3,646	514	4,640
Comprehensive	36	141	3,921	96	54	358	528
Baccalaureate	5	153	4,584	84	na	na	na
52.03 Accounting							
Research	27	155	4,622	96	440	3	463
Doctoral	14	161	4,737	95	1,880	0	2,729
Comprehensive	37	151	4,299	98	212	0	290
52.08 Financial Management and Services							
Research	23	174	4,965	96	995	0	995
Doctoral	10	174	5,183	95	8,296	1,692	9,989
Comprehensive	16	157	4,395	98	156	0	0

Once again, the analysis yields information important to any study of costs at the institutional level:

- The progression in costs conforms to expectations across the disciplines, i.e., in looking at expenditures per credit hour or per FTE student taught, research universities tend to be most expensive, followed by doctoral universities and comprehensive institutions, respectively. Baccalaureate colleges show unexpectedly high expenditure levels, but as noted earlier, this is likely sample dependent as the baccalaureate schools participating in the Delaware Study tended to be private, liberal arts colleges who place a premium on small class size.
- Personnel costs represent roughly nine of every ten dollars spent in the instruction area. It is therefore fair to look not only at teaching loads as a return on investment, but also non-instructional activity including research and public service.
- The gap between the cost per credit hour taught at a research university and that for a comprehensive institution is, predictably, narrower in the fine arts, humanities, social sciences, and business than in the natural and physical sciences and engineering. Thus, institutions—particularly at the research and doctoral level—with significant curricular emphasis on the sciences and engineering will be at a distinct disadvantage with respect to costs when compared with institutions with heavy emphasis on non-scientific disciplines.

- On the other hand, when examining external funding for research and public service, research universities, not surprisingly, have significantly larger contract and grant expenditures than the other Carnegie classifications. This is not a trivial finding, as research institutions have heavy investments in graduate level education. Graduate education cannot be measured simply in terms of student credit hours. Much of the learning at the graduate level takes place in a laboratory setting through interaction between faculty researchers and graduate research assistants. These data suggest that such research activity is, indeed being supported, including assistantship support for the aforementioned graduate students. Moreover, there is an increasing emphasis on undergraduate research activity on campuses, wherein undergraduate students engage in collaborative research with senior faculty as part of a capstone experience.

Beginning with the 2000-01 data collection cycle, the Delaware Study will gather not only quantitative information on faculty activity, i.e., teaching load and sponsored research and service, but also qualitative information, including the following variables:

- Number of refereed publications within past the 36 months
- Number of textbooks, reference books, novels, volumes of collected works within the past 36 months
- Number of edited volumes within the past 36 months
- Number of juried shows/performances within the past 36 months
- Number of editorial positions held within the past 36 months
- Number of externally funded contracts and grants and/or commissioned works or performances within the past 36 months
- Number of non-refereed publications within the past 36 months
- Number of active memberships in professional associations and/or honor societies within the past 36 months
- Number of faculty engaged in faculty development or curriculum development activity as part of their assigned workload
- Five year undergraduate persistence and graduation rates for three most recent student cohorts
- Most recent student satisfaction scores for: a) quality of faculty academic advisement; b) out of class availability of faculty; and c) overall quality of interaction with faculty
- Proportion of the three most recent graduating classes finding curriculum-related employment within 12 months of commencement
- Proportion of students passing licensing, certification, or accreditation examinations related to their academic major

- The three most recent graduating classes continuing to pursue further graduate or professional education
- Number of undergraduate students formally engaged in research with a faculty mentor within the past 12 months
- Number of students engaged in internships or practica under direct supervision of faculty within the past 12 months
- Number of students who author or co-author with a faculty mentor, an article or chapter over the past 36 months
- Number of students presenting or co-presenting with a faculty mentor, a paper at a professional meeting within the past 36 months

These variables represent an ambitious addition to the current data collection activity within the Delaware Study. Nonetheless, they are absolutely essential to providing a more richly textured picture of the return on investment for the cost of a college education. For that, in the view of those 300 plus institutions affiliated with the Delaware Study, is where the focus of the current discussion of higher education expenditures should be—not solely on cost, but also on productivity.

Final Thoughts

As the preceding paragraphs indicate, the basic intent of the Delaware Study of Instructional Costs and Productivity is to focus on the linkage between expenditures for higher education and the measures of productivity that grow out of those expenditures. In any discussion of the cost of higher education, it is not enough to simply focus on expenditures. If it costs $30,000 to educate an undergraduate at institution A and $10,000 to educate an undergraduate at institution B, is institution A three times better than institution B or three times more inefficient? How would one know? What output measures exist to describe return on investment? These are precisely the issues that the Delaware Study grapples with, and they are the very issues being ignored by NCES and NACUBO, both studies focusing solely on expenditures.

While well intentioned, the NCES and NACUBO studies are too narrow in scope and will potentially obfuscate any useful discussion as the result of additional complexities in their methodology. For example, the NCES study was expected to do a detailed analysis of costs associated with technology, and with the construction and/or renovation of instructional facilities. What is meant by technology? Does it refer only to computing hardware and software used in teaching, research, or service activity? Does it refer to computing used in support of administrative activity? What about computing technology used in support of environmental control of climate or lighting. Do we mean hardware and software only, or the support personnel that operate and

maintain systems? And what is instructional space? At the University of Delaware, a significant portion of the curriculum is web-based. Every dormitory room on campus is hard-wired to the mainframe, and students are learning asynchronously at all hours of the day, using the Internet.

The NACUBO methodology is no less complex and ambiguous. The allocation formulae for attributing administrative and capital expenditures are fraught with questions, and will most certainly lead to controversy over basic accounting strategies, especially in light of the fundamental differences in reporting requirements between public and private higher education institutions.

Cost analysis methodologies such as those provided through the Delaware Study, represent straightforward tools for estimating the cost of instruction, while at the same time providing information on the overall productivity of faculty. The classroom is the real focus for questions about higher education costs: Do faculty teach undergraduates? How many and how well? Is there a qualitative dimension to measuring what faculty do? Those associated with the Delaware Study believe that it has been the only viable vehicle for addressing these issues, and through qualitative expansion of its data collection activity, will continue to provide even better answers.

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Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
1.00	AGRICULTURAL BUSINESS AND PRODUCTION									
	Research	123	172	233	3,906	4,859	5,653	89	93	96
1.01	Agricultural Business and Management									
	Research	110	149	200	3,163	4,300	5,583	90	94	97
2.00	AGRICULTURAL SCIENCES									
	Research	145	191	247	4,061	5,730	6,832	86	91	94
	Comprehensive	115	132	191	3,497	4,006	6,777	94	96	97
2.01	Agriculture/Agricultural Sciences									
	Comprehensive	123	182	258	3,679	5,445	7,748	93	96	97
2.02	Animal Sciences									
	Research	150	229	286	4,362	6,351	7,822	87	92	94
2.03	Food Sciences and Technology									
	Research	109	152	190	3,315	3,846	5,869	82	90	96
2.04	Plant Sciences									
	Research	145	196	241	4,593	5,723	6,430	84	92	95
3.00	CONSERVATION & RENEWABLE NATURAL RESOURCES									
	Research	148	175	222	4,168	5,074	6,629	89	92	95
	Doctoral	184	198	293	5,931	7,296	8,300	81	95	96
3.01	Natural Resources Conservation									
	Research	146	215	373	4,318	6,696	8,884	89	90	93
3.05	Forestry and Related Sciences									
	Research	147	171	223	4,611	4,964	7,017	90	93	95
4.00	ARCHITECTURE AND RELATED PROGRAMS									
	Research	186	232	271	4,983	6,204	7,056	91	94	96
	Doctoral	178	233	297	4,947	6,570	10,424	77	86	89
4.02	Architecture									
	Research	168	213	235	4,874	5,882	6,941	89	92	96
4.03	City/Urban, Community and Regional Planning									
	Research	233	341	573	6,130	7,183	11,093	94	95	96

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
4.06	Landscape Architecture									
	Research	134	233	340	4,904	6,212	6,923	91	94	95
5.00	AREA, ETHNIC AND CULTURAL STUDIES									
	Research	113	151	215	3,319	4,092	5,877	89	93	96
	Doctoral	88	145	178	2,813	4,322	5,345	92	94	97
	Comprehensive	100	113	251	2,503	3,102	4,539	87	95	98
5.01	Area Studies									
	Research	140	189	519	3,950	5,474	10,561	88	94	99
5.02	Ethnic and Cultural Studies									
	Research	104	131	193	3,094	4,028	5,699	90	93	96
	Doctoral	90	145	192	2,858	4,341	6,644	91	94	96
	Comprehensive	81	103	125	2,503	3,102	4,539	92	96	98
9.00	COMMUNICATIONS									
	Research	110	139	195	3,227	4,601	5,762	88	93	96
	Doctoral	97	122	171	2,991	3,479	4,933	89	92	95
	Comprehensive	78	116	162	2,524	3,417	4,851	94	96	97
	Baccalaureate	100	126	141	2,989	3,772	4,223	93	94	98
9.01	Communications, General									
	Research	86	109	130	2,789	3,261	3,784	94	95	97
	Doctoral	87	106	125	2,604	3,092	3,575	88	92	95
	Comprehensive	74	90	120	2,313	2,723	3,590	93	96	97
	Baccalaureate	77	126	155	2,321	3,772	4,636	83	94	97
9.04	Journalism and Mass Communications									
	Research	124	181	258	4,601	5,304	7,532	87	92	95
	Doctoral	86	122	203	3,012	3,479	5,864	90	91	94
	Comprehensive	153	170	234	4,591	5,067	6,831	93	96	98
9.07	Radio and Television Broadcasting									
	Comprehensive	145	174	184	4,903	5,309	5,634	90	95	99
11.00	COMPUTER AND INFORMATION SCIENCES									
	Research	143	164	199	3,962	4,726	6,244	88	91	93
	Doctoral	110	127	164	3,059	3,820	4,983	87	92	95
	Comprehensive	86	120	140	2,698	3,551	4,150	92	95	97
	Baccalaureate	96	186	285	2,886	5,567	8,554	87	93	98
11.01	Computer and Information Sciences, General									
	Research	143	162	192	3,982	4,681	6,051	87	90	93
	Doctoral	102	127	164	2,817	3,769	4,854	89	92	96
	Comprehensive	78	132	145	2,974	3,844	4,178	93	96	97
	Baccalaureate	114	193	324	3,424	5,790	9,735	67	92	95

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
11.07	Computer Science									
	Comprehensive	90	115	120	2,617	3,376	4,338	90	94	97
13.00	EDUCATION									
	Research	156	197	305	3,915	4,920	6,968	89	95	97
	Doctoral	110	147	205	2,935	3,824	4,890	91	95	97
	Comprehensive	106	137	178	2,809	3,671	4,807	94	96	98
	Baccalaureate	120	140	192	3,327	3,864	4,703	80	90	94
13.01	Education, General									
	Research	154	180	239	3,702	4,340	5,811	86	92	96
	Doctoral	162	188	199	3,869	4,723	6,829	85	93	95
	Comprehensive	89	129	163	2,676	3,521	3,989	92	96	97
	Baccalaureate	134	153	207	3,463	4,328	5,062	74	88	92
13.03	Curriculum and Instruction									
	Research	162	185	305	3,834	4,700	6,810	87	94	96
	Doctoral	103	123	143	2,626	3,569	4,616	89	92	96
	Comprehensive	86	112	155	2,123	3,178	3,721	96	97	98
13.04	Education Administration & Supervision									
	Research	324	374	456	5,778	7,149	9,432	91	96	97
	Doctoral	143	202	269	2,991	4,833	5,773	94	96	97
	Comprehensive	101	192	349	3,205	5,209	6,662	95	97	99
13.06	Educational Evaluation, Research and Statistics									
	Research	176	211	240	3,923	4,694	5,713	95	97	98
13.08	Educational Psychology									
	Research	158	233	313	3,718	5,787	7,031	94	96	98
13.10	Special Education									
	Research	156	265	291	3,961	5,063	7,237	78	91	95
	Doctoral	105	140	178	2,428	3,180	4,915	85	96	97
	Comprehensive	119	147	180	3,091	3,666	4,899	96	97	98
13.11	Student Counseling and Personnel Services									
	Research	177	228	249	4,294	4,842	5,530	96	97	98
	Doctoral	164	209	415	3,381	4,170	7,654	88	95	97
	Comprehensive	136	180	246	2,854	4,059	5,271	93	94	98
13.12	General Teacher Education									
	Research	109	136	160	3,415	3,934	5,152	86	90	93
	Doctoral	100	186	219	2,648	4,563	5,582	83	96	97
	Comprehensive	118	139	155	2,415	3,762	4,316	92	95	96

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
13.13	Teacher Education, Specific Academic & Vocational Program									
	Research	95	158	171	2,858	4,071	4,877	86	93	95
	Doctoral	85	109	124	2,551	2,948	4,478	89	92	96
	Comprehensive	97	130	171	2,724	3,509	4,814	93	96	98
14.00	ENGINEERING									
	Research	272	375	476	7,709	10,032	13,182	85	91	94
	Doctoral	233	316	412	7,003	8,725	11,206	85	89	93
	Comprehensive	203	255	343	6,806	8,227	9,703	90	95	98
14.01	Engineering, General									
	Doctoral	131	254	502	3,922	7,606	15,052	50	84	92
	Comprehensive	227	276	410	6,156	7,638	11,506	71	94	98
14.02	Aerospace, Aeronautical & Astronautical Engineering									
	Research	351	448	499	10,357	11,536	13,019	82	92	97
14.03	Agricultural Engineering									
	Research	219	251	376	6,119	7,273	10,183	87	89	96
14.05	Bioengineering and Biomedical Engineering									
	Research	304	533	1,009	5,851	12,890	26,706	59	83	93
14.07	Chemical Engineering									
	Research	314	408	469	9,068	11,040	14,005	85	90	94
	Doctoral	250	390	443	7,744	10,628	12,247	82	90	92
	Comprehensive	180	219	341	6,967	9,260	10,157	88	92	97
14.08	Civil Engineering									
	Research	300	377	466	8,326	9,970	13,100	88	92	93
	Doctoral	265	311	408	8,064	9,183	10,762	82	85	89
	Comprehensive	203	235	327	6,170	8,255	9,817	91	97	98
14.10	Electrical, Electronics & Comm. Engineering									
	Research	269	353	395	7,835	9,518	10,978	84	91	94
	Doctoral	183	292	338	6,620	7,431	8,935	90	91	93
	Comprehensive	192	257	326	6,593	8,151	8,644	90	95	98
14.17	Industrial/Manufacturing Engineering									
	Research	247	345	422	7,473	8,854	10,752	86	91	94
	Doctoral	195	255	489	5,343	6,726	11,962	75	84	94
14.18	Materials Engineering									
	Research	314	461	655	10,347	11,880	16,464	81	86	94

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Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
14.19	Mechanical Engineering									
	Research	314	395	507	8,541	10,415	13,919	89	92	94
	Doctoral	237	298	415	7,668	9,103	11,783	82	86	94
	Comprehensive	194	271	350	7,700	8,769	10,219	90	95	97
15.00	ENGINEERING-RELATED TECHNOLOGIES									
	Research	171	214	339	3,595	6,156	10,996	77	86	92
	Doctoral	170	250	264	4,545	7,209	7,582	72	90	91
	Comprehensive	136	171	255	4,019	5,950	7,663	91	93	96
15.06	Industrial Production Technologies									
	Comprehensive	133	171	248	3,924	4,935	7,390	89	93	95
16.00	FOREIGN LANGUAGES AND LITERATURES									
	Research	113	146	194	3,636	4,589	6,280	95	97	98
	Doctoral	98	124	143	2,917	3,567	4,237	91	96	97
	Comprehensive	103	126	171	3,296	3,794	5,115	96	98	98
	Baccalaureate	120	173	254	3,596	5,160	7,634	96	97	98
16.01	Foreign Languages and Literature									
	Research	93	125	166	2,805	3,764	5,220	95	97	98
	Doctoral	96	112	138	2,851	3,348	4,103	92	96	97
	Comprehensive	110	122	146	3,438	3,817	4,624	96	98	98
	Baccalaureate	130	168	193	3,891	5,018	5,789	96	98	98
16.03	East and Southeast Asian Languages and Literatures									
	Research	140	274	335	4,747	7,922	9,650	94	96	98
16.04	East European Languages and Literatures									
	Research	117	204	456	4,474	6,675	12,688	90	95	96
16.05	Germanic Languages and Literatures									
	Research	163	231	306	5,059	6,836	8,695	95	97	98
16.09	Romance Languages and Literatures									
	Research	134	146	158	4,128	4,304	4,716	95	97	98
	Doctoral	117	133	156	3,358	3,930	4,618	95	97	98
	Comprehensive	78	99	171	2,017	2,962	3,797	87	97	98
16.12	Classical & Ancient Near Eastern Languages & Literatures									
	Research	108	132	153	3,582	4,211	4,637	95	96	98
19.00	HOME ECONOMICS									
	Research	102	157	195	3,462	4,456	5,576	91	94	95
	Doctoral	103	167	194	2,957	4,845	5,770	85	90	93
	Comprehensive	81	108	135	2,421	3,247	3,753	92	94	96

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp Per SCH			Exp Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
19.01	Home Economics, General									
	Research	91	142	189	3,116	4,316	5,420	94	95	97
	Comprehensive	76	101	122	2,261	2,913	3,744	94	95	96
19.04	Family/Consumer Resource Mngmt									
	Research	76	126	222	2,647	3,737	6,475	92	93	94
19.05	Food & Nutrition Studies									
	Research	104	158	203	3,501	4,376	5,790	89	90	94
	Comprehensive	80	132	170	2,389	3,373	3,742	84	92	92
19.07	Individual & Family Development Studies									
	Research	91	126	154	2,627	3,427	4,309	94	95	96
19.09	Clothing & Textile Studies									
	Research	164	197	217	4,945	5,703	6,438	92	93	96
22.00	LAW AND LEGAL STUDIES									
	Research	216	252	334	3,918	4,876	6,006	89	93	95
	Doctoral	188	228	239	4,105	4,276	4,890	80	88	94
	Comprehensive	91	203	261	2,731	4,027	6,103	85	92	97
22.01	Law and Legal Studies									
	Research	216	252	334	3,918	4,876	6,006	89	93	95
	Doctoral	188	228	239	4,105	4,276	4,890	80	88	94
	Comprehensive	91	203	261	2,731	4,027	6,103	85	92	97
23.00	ENGLISH LANGUAGE AND LITERATURE/LETTERS									
	Research	90	111	149	2,895	3,411	4,312	96	97	98
	Doctoral	87	107	135	2,757	3,299	3,959	93	96	98
	Comprehensive	83	101	123	2,489	3,019	3,662	96	98	98
	Baccalaureate	92	115	176	2,746	3,442	5,277	96	97	99
23.01	English Language & Literature, General									
	Research	93	113	149	3,085	3,521	4,610	96	97	98
	Doctoral	92	107	132	2,804	3,243	3,856	93	95	98
	Comprehensive	83	99	122	2,480	2,973	3,653	97	98	98
	Baccalaureate	99	126	185	2,962	3,770	5,535	94	97	98
23.04	English Composition									
	Comprehensive	54	103	132	2,093	3,080	3,953	96	97	99
23.10	Speech and Rhetorical Studies									
	Research	85	92	108	2,562	2,736	3,309	96	97	98
	Doctoral	82	111	163	2,371	3,609	4,847	93	96	97
	Comprehensive	81	103	128	2,396	3,100	3,844	92	95	97

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
24.00	LIBERAL ARTS & SCIENCES, GENERAL STUDIES & HUMANITIES									
	Research	54	98	122	1,633	2,878	3,645	85	92	96
	Doctoral	138	170	359	4,120	5,044	10,579	56	94	97
	Comprehensive	85	110	195	2,561	3,065	5,842	94	96	96
24.01	Liberal Arts and Science, General Studies * Humanities									
	Research	54	98	122	1,633	2,878	3,645	85	92	96
	Doctoral	138	170	359	4,120	5,044	10,579	56	94	97
	Comprehensive	85	110	195	2,561	3,065	5,842	94	96	96
25.00	LIBRARY SCIENCE									
	Research	192	250	345	3,607	5,071	7,286	84	91	92
25.01	Library Science/Librarianship									
	Research	192	250	345	3,607	5,071	7,286	84	91	92
26.00	BIOLOGICAL SCIENCES/LIFE SCIENCES									
	Research	147	217	318	4,620	6,252	8,646	88	91	93
	Doctoral	104	153	200	3,546	4,371	5,212	82	87	93
	Comprehensive	89	119	150	2,894	3,740	4,467	88	91	94
	Baccalaureate	76	132	221	2,278	3,953	6,642	83	89	92
26.01	Biology, General									
	Research	125	186	216	3,733	5,353	7,260	84	89	92
	Doctoral	98	153	187	3,593	4,371	5,040	81	87	93
	Comprehensive	90	119	150	2,898	3,700	4,460	88	91	94
	Baccalaureate	83	143	290	2,467	4,285	8,319	82	87	92
26.02	Biochemistry and Biophysics									
	Research	181	275	348	5,184	7,328	9,436	88	92	94
26.03	Botany									
	Research	189	263	303	5,508	6,558	7,955	90	91	95
26.05	Microbiology/Bacteriology									
	Research	190	274	333	5,393	7,399	8,702	89	91	92
26.06	Miscellaneous Biological Specializations									
	Research	149	269	392	3,961	7,538	10,718	88	95	97
26.07	Zoology									
	Research	148	248	388	5,150	6,298	11,198	90	92	94

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
27.00	MATHEMATICS									
	Research	96	129	182	3,006	3,792	5,153	92	95	96
	Doctoral	81	114	138	2,488	3,373	4,155	93	97	97
	Comprehensive	87	107	122	2,648	3,283	3,665	96	97	98
	Baccalaureate	76	95	122	2,291	2,842	3,674	94	95	98
27.01	Mathematics									
	Research	94	119	166	3,117	3,728	4,988	94	96	97
	Doctoral	80	114	146	2,415	3,373	4,326	93	97	97
	Comprehensive	86	103	122	2,640	3,218	3,668	96	98	98
	Baccalaureate	81	97	126	2,427	2,903	3,793	93	95	98
27.05	Mathematical Statistics									
	Research	98	143	188	2,828	3,699	5,106	91	94	96
29.00	MILITARY TECHNOLOGIES									
	Comprehensive	47	65	80	1,819	2,122	2,811	67	80	90
29.01	Military Technologies									
	Comprehensive	47	65	80	1,819	2,122	2,811	67	80	90
30.00	MULTI/INTERDISCIPLINARY STUDIES									
	Research	144	213	399	3,912	5,677	8,401	92	94	96
	Doctoral	112	141	369	3,982	5,073	10,960	83	92	95
	Comprehensive	116	160	325	3,454	4,530	6,821	94	96	97
30.08	Mathematics and Computer Science									
	Comprehensive	78	120	151	2,329	3,549	4,530	95	96	98
31.00	PARKS, RECREATION, LEISURE & FITNESS STUDIES									
	Research	101	151	193	3,373	4,656	5,560	88	91	94
	Doctoral	83	173	219	2,386	4,952	5,787	93	95	97
	Comprehensive	93	111	134	2,785	3,428	3,942	93	95	96
	Baccalaureate	131	149	173	3,911	4,472	5,183	77	91	93
31.01	Parks, Recreation and Leisure Studies									
	Research	105	181	309	3,572	5,074	8,606	88	91	95
	Comprehensive	113	145	202	2,979	4,149	4,390	91	93	95
31.05	Health and Physical Education/Fitness									
	Research	85	160	192	3,468	4,763	5,670	88	91	94
	Doctoral	71	173	228	2,025	4,952	6,148	91	95	97
	Comprehensive	94	111	133	2,826	3,319	3,871	93	95	96
	Baccalaureate	131	149	173	3,911	4,472	5,183	77	91	93

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
38.00	PHILOSOPHY AND RELIGION									
	Research	90	121	155	2,793	3,606	4,551	95	96	97
	Doctoral	101	129	182	3,132	3,879	5,421	92	96	98
	Comprehensive	87	108	120	2,742	3,270	3,605	96	98	99
	Baccalaureate	95	116	143	2,863	3,471	4,292	97	98	99
38.01	Philosophy									
	Research	90	117	151	2,807	3,635	4,489	95	96	97
	Doctoral	99	124	183	3,107	3,714	5,428	94	96	98
	Comprehensive	75	94	112	2,433	3,173	3,365	97	99	99
	Baccalaureate	115	126	201	3,443	3,789	6,018	97	99	99
38.02	Religion/Religious Studies									
	Research	66	122	161	2,079	3,562	5,110	95	96	98
	Doctoral	103	158	273	3,028	4,505	7,335	83	89	94
	Comprehensive	89	110	125	2,660	3,124	3,672	94	98	98
38.99	Philosophy and Religion									
	Comprehensive	101	110	121	2,985	3,309	3,621	96	98	99
40.00	PHYSICAL SCIENCES									
	Research	167	215	294	5,004	6,582	8,760	87	92	95
	Doctoral	110	164	219	3,994	5,150	6,320	85	90	94
	Comprehensive	116	148	179	3,641	4,605	5,489	90	94	96
	Baccalaureate	122	180	283	3,651	5,389	8,502	88	90	94
40.01	Physical Sciences, General									
	Comprehensive	64	96	134	2,560	2,870	3,971	89	94	96
40.04	Atmospheric Sciences and Meteorology									
	Research	243	334	921	6,867	11,099	21,401	81	92	97
40.05	Chemistry									
	Research	158	194	254	4,520	5,854	7,622	85	89	92
	Doctoral	117	186	233	3,819	5,155	6,444	83	87	91
	Comprehensive	118	146	195	3,732	4,439	5,873	90	93	95
	Baccalaureate	133	180	243	3,981	5,388	7,293	88	92	95
40.06	Geological and Related Sciences									
	Research	143	206	257	4,382	5,995	7,436	86	92	95
	Doctoral	102	151	211	2,931	5,274	6,167	83	92	95
	Comprehensive	106	124	175	3,664	4,607	5,364	90	94	95
40.07	Miscellaneous Physical Sciences									
	Research	307	430	867	9,491	11,839	19,534	91	94	100

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
40.08	Physics									
	Research	185	239	302	5,719	7,184	9,228	88	94	96
	Doctoral	102	154	240	3,998	4,675	6,948	86	91	94
	Comprehensive	129	157	179	4,362	5,049	5,576	91	95	97
	Baccalaureate	115	266	340	3,432	7,981	10,195	87	93	96
42.00	PSYCHOLOGY									
	Research	99	126	165	3,163	4,079	5,026	91	94	96
	Doctoral	89	116	140	2,657	3,461	4,026	90	94	96
	Comprehensive	81	93	120	2,438	2,819	3,465	95	97	98
	Baccalaureate	68	108	173	2,042	3,020	5,181	92	96	97
42.01	Psychology									
	Research	98	124	173	3,162	4,182	5,037	91	94	96
	Doctoral	89	116	140	2,640	3,302	3,940	90	94	96
	Comprehensive	81	93	118	2,443	2,813	3,451	95	97	98
	Baccalaureate	68	108	173	2,042	3,020	5,181	92	96	97
43.00	PROTECTIVE SERVICES									
	Research	108	115	123	3,070	3,337	4,614	85	92	94
	Doctoral	89	104	108	2,782	3,113	3,437	85	94	97
	Comprehensive	63	82	102	2,166	2,543	2,952	95	96	97
43.01	Criminal Justice and Corrections									
	Research	108	115	123	3,070	3,337	4,614	85	92	94
	Doctoral	89	104	108	2,782	3,113	3,437	85	94	97
	Comprehensive	70	90	104	2,167	2,711	2,953	94	96	96
44.00	PUBLIC ADMINISTRATION AND SERVICES									
	Research	169	267	388	3,801	5,533	9,314	88	92	96
	Doctoral	138	187	269	3,759	4,752	7,634	88	92	95
	Comprehensive	111	147	220	3,097	4,007	5,062	90	94	97
44.04	Public Administration									
	Research	282	383	693	5,113	8,599	12,803	88	96	97
	Doctoral	174	272	486	4,430	6,508	10,355	87	93	96
	Comprehensive	118	195	336	2,413	4,259	6,040	93	96	97
44.07	Social Work									
	Research	150	217	269	3,407	4,589	5,663	89	92	95
	Doctoral	117	150	248	3,490	4,092	5,320	86	89	94
	Comprehensive	104	139	205	3,110	3,934	5,040	90	94	96
45.00	SOCIAL SCIENCES AND HISTORY									
	Research	96	125	175	3,055	3,888	4,990	93	95	97
	Doctoral	96	131	162	2,998	3,677	4,768	93	96	97
	Comprehensive	83	102	120	2,533	3,075	3,679	96	98	98
	Baccalaureate	89	106	145	2,682	3,180	4,285	96	98	99

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
45.01	Social Sciences, General									
	Doctoral	63	114	155	2,190	2,900	3,786	83	94	95
	Comprehensive	45	70	94	1,356	2,298	3,066	96	97	98
45.02	Anthropology									
	Research	98	147	186	3,063	4,293	5,222	93	94	95
	Doctoral	83	115	139	3,031	3,397	4,325	92	96	97
	Comprehensive	83	105	130	2,483	3,020	3,797	95	97	98
45.06	Economics									
	Research	87	126	167	3,207	4,049	4,861	94	95	96
	Doctoral	115	141	173	3,528	4,137	5,095	94	96	98
	Comprehensive	91	102	115	2,732	3,213	4,011	97	98	98
	Baccalaureate	118	131	222	3,545	3,934	6,648	97	99	99
45.07	Geography									
	Research	91	127	165	2,708	3,870	4,936	89	91	95
	Doctoral	81	121	150	2,830	3,493	4,326	87	95	97
	Comprehensive	67	98	107	2,439	2,953	3,171	91	95	97
45.08	History									
	Research	99	124	158	3,077	3,975	4,737	95	96	98
	Doctoral	100	133	164	3,052	3,737	4,775	94	96	98
	Comprehensive	82	104	126	2,535	3,122	3,709	97	98	99
	Baccalaureate	87	111	134	2,619	3,336	4,013	96	98	99
45.10	Political Science and Government									
	Research	108	165	203	3,557	4,852	5,929	93	95	96
	Doctoral	100	166	228	3,079	4,661	6,377	91	97	98
	Comprehensive	95	117	137	2,809	3,521	4,163	97	97	98
	Baccalaureate	83	139	222	2,501	4,156	6,660	96	97	99
45.11	Sociology									
	Research	85	108	133	2,815	3,232	3,819	93	96	97
	Doctoral	88	109	157	2,661	3,205	4,475	91	96	98
	Comprehensive	80	95	113	2,349	2,746	3,221	96	98	98
	Baccalaureate	95	104	199	2,855	3,115	5,076	96	98	99
50.00	VISUAL AND PERFORMING ARTS									
	Research	143	191	267	4,535	5,780	7,676	89	93	95
	Doctoral	145	180	227	4,464	5,445	7,060	87	92	95
	Comprehensive	119	168	213	3,871	5,131	6,377	92	94	96
	Baccalaureate	147	178	273	4,404	5,335	8,200	90	93	94
50.01	Visual and Performing Arts									
	Research	116	172	272	4,042	5,156	7,746	85	96	97
	Comprehensive	87	152	236	3,621	4,209	5,063	89	94	97
	Baccalaureate	102	162	248	3,062	4,870	7,451	62	93	95

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
50.03	Dance									
	Research	162	223	329	5,515	7,695	9,716	90	94	95
50.04	Design and Applied Arts									
	Research	160	181	266	4,641	6,298	7,661	88	89	96
	Comprehensive	109	172	186	3,269	4,665	5,438	90	94	95
50.05	Dramatic/Theater Arts and Stagecraft									
	Research	125	190	267	4,461	5,879	7,619	88	89	94
	Doctoral	141	152	218	4,475	5,118	5,882	78	94	95
	Comprehensive	112	162	213	3,878	5,347	6,391	91	94	97
	Baccalaureate	142	273	466	4,266	8,200	13,990	89	91	94
50.07	Fine Arts and Art Studies									
	Research	129	159	219	4,141	4,865	6,303	91	93	96
	Doctoral	126	161	196	4,041	4,966	5,918	90	93	96
	Comprehensive	115	142	175	3,601	4,568	5,382	93	95	96
	Baccalaureate	116	161	216	3,468	4,824	6,471	84	93	93
50.09	Music									
	Research	168	227	292	5,167	7,212	8,525	90	92	96
	Doctoral	182	257	420	5,898	7,851	9,985	88	92	95
	Comprehensive	160	202	287	4,843	6,346	8,603	92	94	95
	Baccalaureate	154	189	294	4,621	5,658	8,816	91	93	96
51.00	HEALTH PROFESSIONS AND RELATED SCIENCES									
	Research	192	286	388	4,721	7,502	9,890	87	91	95
	Doctoral	145	228	292	3,848	5,352	8,315	88	93	96
	Comprehensive	149	205	266	4,449	5,496	7,989	92	94	96
	Baccalaureate	211	312	356	5,792	8,239	10,378	89	92	95
51.02	Communication Disorders Sciences and Services									
	Research	138	214	282	4,207	5,555	7,850	91	94	96
	Doctoral	104	155	223	2,494	3,798	5,062	90	96	96
	Comprehensive	116	200	225	3,440	4,914	5,587	94	96	97
51.07	Health and Medical Administrative Services									
	Comprehensive	110	180	293	3,060	5,392	8,787	94	95	96
51.16	Nursing									
	Research	249	288	334	7,097	8,112	9,743	89	91	94
	Doctoral	181	268	332	4,700	7,490	9,609	87	89	96
	Comprehensive	190	241	318	5,462	7,230	8,645	90	95	96
51.20	Pharmacy Administration and Pharmaceutics									
	Research	144	224	353	4,732	7,809	9,696	79	90	92

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
51.22	Public Health									
	Research	237	563	868	5,419	10,126	16,465	86	89	97
51.23	Rehabilitation/Therapeutic Services									
	Research	183	265	373	3,897	5,349	7,147	71	88	95
	Comprehensive	156	254	259	4,200	5,884	7,989	84	89	93
51.24	Veterinary Medicine (D.V.M.)									
	Research	399	497	935	5,962	8,677	14,373	71	83	90
52.00	BUSINESS MANAGEMENT & ADMINISTRATIVE SERVICE									
	Research	120	156	191	3,688	4,459	5,330	94	97	98
	Doctoral	117	143	176	3,594	4,247	4,995	93	95	97
	Comprehensive	112	139	179	3,248	3,949	4,846	96	98	98
	Baccalaureate	95	129	203	2,817	3,878	6,078	91	94	96
52.01	Business									
	Research	105	139	207	3,717	4,334	5,456	93	98	99
	Doctoral	105	136	166	3,064	3,934	4,463	77	94	96
	Comprehensive	118	148	173	3,228	4,323	4,681	96	97	98
	Baccalaureate	86	115	165	2,586	3,447	4,958	87	93	95
52.02	Business Administration and Management									
	Research	99	143	186	3,422	3,947	4,599	94	96	98
	Doctoral	117	128	150	3,413	3,681	4,305	93	95	97
	Comprehensive	114	132	156	3,290	3,703	4,358	95	97	98
	Baccalaureate	95	145	215	2,833	4,345	6,455	68	91	97
52.03	Accounting									
	Research	115	162	185	4,209	4,617	5,401	94	97	98
	Doctoral	122	155	206	3,974	4,805	5,748	92	96	97
	Comprehensive	113	138	185	3,289	4,100	5,329	97	98	99
52.06	Business/Managerial Economics									
	Research	113	130	137	3,209	3,675	5,005	97	97	99
	Doctoral	112	125	144	3,608	3,730	4,019	92	96	96
	Comprehensive	103	136	152	3,038	3,610	4,133	97	98	99
52.08	Financial Management and Services									
	Research	132	163	200	4,029	4,614	5,575	94	96	98
	Doctoral	113	165	232	4,152	4,906	6,500	92	95	98
	Comprehensive	112	153	195	3,268	4,238	5,181	98	98	99
52.09	Hospitality Services Management									
	Research	155	185	218	4,573	5,379	6,291	89	91	95
	Comprehensive	80	88	198	2,397	2,623	5,760	91	93	93

Figure 4.—Quartile values for direct instructional expenditure per SCH and per FTE student and personnel cost as percent of total direct instructional expenditure, by Carnegie classification: 1998 —Continued

CIP	Discipline/Carnegie Classification	Exp. Per SCH			Exp. Per FTE Student			Personnel Cost as % of Total		
		25%	50%	75%	25%	50%	75%	25%	50%	75%
52.10	Human Resources Management									
	Research	144	176	234	4,021	5,888	13,650	95	98	99
52.12	Business Information and Data Processing Services									
	Doctoral	108	141	151	3,229	4,346	4,498	92	96	97
	Comprehensive	104	138	167	3,123	4,072	5,000	95	96	98
52.13	Business Quantitative Methods & Management Science									
	Research	100	157	191	2,853	4,228	4,865	92	97	99
52.14	Marketing Management and Research									
	Research	124	160	178	3,916	4,587	4,982	96	97	98
	Doctoral	124	152	215	3,875	4,616	5,694	93	95	97
	Comprehensive	125	146	163	3,408	4,174	4,406	97	98	99

Higher Education's Costs, Prices, and Subsidies: Some Economic Facts and Fundamentals

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The most useful contribution I can make to NCES' efforts to think carefully about costs and prices in higher education is to review some of the facts and economic fundamentals about colleges and universities that have become clear over the past few years and note some of their significance for higher education policy. I will draw, as suggested, heavily on my previous work.[1]

Economic Characteristics of Colleges and Universities

Fundamentally, colleges and universities and the higher education 'industry'—*appear* to be much like the ordinary business firms and industries we're familiar with, but in critically important ways, they're not. It is easy to make very big mistakes by neglecting those differences and giving in to the easy appeal of the 'common sense'—or even the economic theory—we've derived from observing ordinary for-profit firms and industries. It's a familiar assertion from faculties that "colleges and universities are not business firms," and while that's a poor excuse for exemption from the economic realities of costs and quality and market forces, it is certainly true that colleges and universities are not *ordinary* business firms.

So I want, first, to describe the *economic* characteristics of colleges and universities that make them existentially different from conventional for-profit firms.

1) Prices never cover costs so every customer is subsidized

The highly significant—and truly remarkable—economic fact is that colleges and universities sell their product—educational services—for a price that's always a great deal less than the

[1]The most relevant of which are cited at the end of this paper.

cost of its production.[2] In commercial terms, they lose money on every unit they sell. It's as if Ford dealers routinely sold the Taurus that costs them $20,000 for a price of $6,250.

On average, for U.S. higher education in 1995–96 (the latest national data) a student paid $4,000 to buy a year of education that cost $12,800 to produce. The average student received a subsidy of $8,800 a year, and, as Table 1 makes clear, that subsidy was about the same size in the private and public sectors.

The immediate questions, of course, are Why? and How do they do it? The Ford dealer who behaved that way would quickly go out of business, but colleges don't. The answer to both questions is the same: higher education is something society wants people to consume, so society subsidizes its price to induce them to do that. A college education is a basis of equality of opportunity; it contributes to the educated citizenry so essential to a democracy, and it has become increasingly important in determining lifetime earnings. It also leads to national economic prosperity and, we think, to a more satisfying life.

Essential social purposes are served by policies that subsidize college students—through government taxing powers that support appropriations, and through private charitable donations, past and present, all of which build endowments and campuses and support scholarships and current spending.

2) Colleges are part charity and part commerce—churches and car dealers

In sharp contrast to business firms, colleges operate both as commercial firms, selling their product for a price, and as charities, giving it away for social purposes. A college can't be analyzed and understood either as a pure commercial operation, as in our well-developed microeconomic theories, or as a simple charity. Henry Hansmann (1986) first identified this crucial economic aspect of a college, calling it a "donative-commercial non-profit firm." On average, over U.S. higher education, the balance between commerce and charity tilts heavily toward charity as 75 percent of the total revenues of colleges and universities come from charitable donations, past and present, and only 25 percent from sales revenues.

That a college is *simultaneously* like a church and a car dealer significantly affects the way policies work, in often unexpected ways. For instance, the popular tax plans that increase enrollments by helping to pay a student's tuition bills but without providing resources to support his subsidy, can—if they work—only lower the quality of his education. Each additional student

[2]The emergence of a for-profit sector in accredited higher education qualifies this statement but it still remains the essential characteristic of the vast majority of colleges and universities that are public and private nonprofit firms. See Winston (1999).

brings, on national average, 31 cents of additional revenue to the school along with a dollar of additional costs. There's no way to cover the other 69 cents except by cutting average spending for everybody. It's as if the food stamp program were expected to work by paying only 31 percent of the costs of groceries.

3) The nondistribution constraint

Unlike business firms, non-profits including colleges and universities, can't pay out profits as dividends to owners. They can *make* 'profits'—revenues from all sources, donative and commercial combined, typically exceed production costs, i.e., donative resources can more than make up for the fact that students' prices don't cover their costs—but they can't distribute them to outsiders.

There is no requirement, however, that subsidy and donative resources be distributed equally within the university, so the long-standing question of internal, "cross-subsidies" remains. It's often framed as a question of using "profits" from one activity—say a large undergraduate Psychology course—to subsidize another, preferred, activity—say a Rose Bowl team. And while that framing is inaccurate because it misses the fact that the Psych courses are themselves subsidized, it remains that highly differentiated subsidies—among college activities, all of which are subsidized—raise much the same issues of internal resource allocation. (The sense of unfairness, though, may not be the same when the issue is recognized to be one of differential subsidies between activities rather than 'taking away profits earned' in one activity to 'give' to another.) The same can be said of the "Robinhooding" charge that pictures students who pay full tuition as providing resources to financial aid students when the fact is, instead, that all students are heavily subsidized but the full-pay students get smaller subsidies than those on financial aid. At Williams, for instance, a year of school costs the full-pay student $31,500 while a financial aid student may pay as little as $1,000. But since the cost of producing a year at Williams is some $65,000, the full pay student is getting a subsidy of $33,500 a year.

Too, the nondistribution constraint and consequent absence of owners and ownership has served to protect the managements of colleges and universities from the cold wind of take-over bids. This is sometimes seen as discouraging efficiency and contributing to lax management.

4) Managerial motivations

The managers of colleges and universities also are likely to be more idealistic in their motivation. The most apt description of their goals seems to be Clotfelter's "academic excellence"—improving the quality of the educational services their school supplies and the equity with which

they're made available. The goal is laudable in creating strong pressures to invest resources in those things—like faculty research or quality or new programs and facilities or improved student quality—that will increase institutional excellence. But perhaps the most important contribution of that motivation is that it leads college managements to respond to idealistic objectives that are often in direct conflict with sensible, for-profit behavior—like need-blind admission and need-based financial aid. But the goal of excellence surely also weakens management's incentives to cut costs. The positional nature of market competition in higher education, discussed below, also suggests that product competition will often dominate pressures on prices, leading to Howard Bowen's famous conclusion that colleges will always spend whatever money they can get.

5) Information asymmetries and animal spirits

The buyers of higher education are students, for whom higher education is an investment in human capital as much as it is an experience or commodity or service. Higher education is a classic "trust market" where investment decisions are made in the face of an existential ignorance about how it will turn out and whether the hoped-for future gains will materialize. John Maynard Keynes saw such unavoidable ignorance in investment decisions as leading to a reliance on the "animal spirits" of uninformed optimism or pessimism. As people investing in human capital, students typically don't know what they're buying and won't know what they've bought until it is too late to do anything about it. Furthermore, education is a one-shot investment expenditure—a unique rather than a repetitive purchase. This appears to combine with the importance of the parental role in buying higher education to produce a market that fails to achieve the rational calculus of economic decision that works so well when buyers know precisely what they're getting.

6) Customer-input technologies

Higher education is produced with a very strange technology in which the quality of the output depends on the quality of the customers who buy it.[3] Students, it appears, educate other students—and some students do it better than others—so colleges care to whom they sell their product. To get a sense of just how unusual this is, it's as if the car you bought from that Ford dealer would be a better car—it would hold the road better and stop quicker and get better mileage—if the other people buying cars from that dealer were better drivers. If they were very good drivers, your Ford would become a Mercedes.

Institutional concern about student quality is clearest at the top of the pecking order where highly selective schools use their long queues of applicants to pick only those they deem most

[3]This has been modeled effectively; see Rothschild and White (1995).

able to contribute to the educational process (and they keep their queues long by resisting expansion). Indeed, at the top, competition is not competition for sales, it's competition for students whose qualities will best enhance the excellence of the education offered.[4] Significantly, the role of peer effects is recognized, too, in the very pragmatic educational structure of the leading for-profit universities like the University of Phoenix, where instruction is organized to exploit student experience and understanding. The simple, and essentially technological, fact is that education can be better produced with good students who act not only as recipients of educational services, but as producers, too. So whatever "endorsement effect" might be conveyed by a school's touting of its students' quality ("Those who have choices, choose us!"), selective admission plays a central role in producing higher education.

Hierarchy and its Implications

Table 1 is taken from a recent study of student subsidies at more than 2,800 of the roughly 3,400 accredited colleges and universities in the United States in 1995–96. The subsidies shown in Column 2 are expressed in dollars per year per student; they are the difference between what it costs (Column 3) to produce a year of education for the average student and what he or she actually pays for it (Column 4), net of grant aid. That net price is the *commercial* component of the school's per student revenue while the subsidy is the donative or charitable component.[5] Together they must cover the cost of a year's education. Costs, then, can exceed net price by as much as a school's available donative resources will allow. Despite the fact that all firms must meet the same budget constraint, that constraint will mean different things to different firms because they have very different levels of donative resources.

Since schools have different access to resources that support student subsidies they offer different subsidies to their students. The lower section of Table 1 makes this starkly clear where schools have been grouped into deciles according to the size of their student subsidies. Those in the top private decile offer the average student an education that costs $32,600 to produce while charging her a price of $8,500, so she gets a subsidy of $24,100 a year. The average student in the bottom private decile, in sharp contrast, gets a $7,300 education for which she pays a price of $6,700, yielding a $600 subsidy. The public sector encompasses a narrower range of subsidies, from top to bottom, but private sector subsidies are—surprisingly—nearly the same on average

[4]An issue developed most extensively in Winston (2000b).

[5]Recent analysis has produced estimates of institutional saving that, along with subsidies, represent the flow of donative resources; see Winston, Carbone, and Hurshman (2001). Until those estimates were available, it was assumed that subsidies were not only directly dependent on donative resources, but were the same thing (e.g., Winston and Yen 1995).

Table 1.—Costs Prices, Subsidies, and Hierarchy: Schools Ranked by Average Dollar Value of Subsidy, 1995–96

	Enrollment	Average Student Subsidy	Costs: Educational "E&G&K"	Price: Net Tuition and Fees	Price to Cost Ratio (in percent)
	(1)	(2)	(3)	(4)	(5)
All Institutions	3,398	$8,785	$12,787	$4,002	31.3
Public Institutions	5,068	9,171	10,607	1,336	12.6
Private Institutions	1,676	8,284	15,035	6,751	44.9
Public					
Decile 1	5,427	23,786	25,741	1,954	7.6
Decile 2	5,199	11,217	12,438	1,221	9.8
Decile 3	6,994	9,838	11,308	1,470	31.0
Decile 4	4,897	8,826	10,153	1,327	13.1
Decile 5	4,732	8,149	9,442	1,294	13.7
Decile 6	4,535	7,504	8,388	884	10.5
Decile 7	5,100	6,888	8,184	1,297	15.8
Decile 8	4,148	6,291	7,573	1,282	16.9
Decile 9	5,082	5,641	6,831	1,190	17.4
Decile 10	4,564	4,509	5,594	1,446	24.3
Private					
Decile 1	2,332	24,106	32,604	8,498	26.1
Decile 2	1,380	13,206	19,899	6,693	33.6
Decile 3	1,680	10,502	17,600	7,098	40.3
Decile 4	1,827	8,706	14,862	6,156	41.4
Decile 5	1,534	7,341	13,688	6,346	46.4
Decile 6	1,811	6,197	12,649	6,452	51.0
Decile 7	1,588	5,144	11,682	6,538	56.0
Decile 8	1,800	4,047	10,953	6,906	63.1
Decile 9	1,425	2,836	9,002	6,166	68.5
Decile 10	1,384	660	7,313	6,653	91.0

NOTE: Includes 2,809 institutions, of which 1,426 are public and 1,383 are private. All dollar amounts are per FTE student averaged over institutions. Col. 3: educational costs include the share of E&G spending devoted to instruction plus the rental rate for physical capital. Col. 4: Tuition and fees net of grant aid.

SOURCE: Gordon C. Winston and Ivan C. Yen, 1995, "Costs, Prices, Subsidies, and Aid in U.S. Higher Education," Discussion Paper No. 32, The Williams Project on the Economics of Higher Education, July, updated; based on U.S. Department of Education IPEDS data.

as those offered by public sector schools. These data represent all accredited colleges and universities in the United States, two-year, four-year, colleges, and universities. It's significant that as subsidies rise, spending rises by about as much, but prices don't. Indeed, two notable, high-

subsidy-high-expenditure schools (Berea and Cooper Union) charge no tuition at all.[6] In general, then, the high-cost schools are high-subsidy schools and low-cost schools are low-subsidy schools. Indeed, until recently, the tuition at schools in the low-subsidy, low expenditure decile in our data was higher than at the wealthy schools in the top decile.[7]

This difference among schools comes through most sharply, I think, in the column of Table 1 labeled "Price to Cost Ratio." What those numbers describe is how much a student has to pay for a dollar's worth of educational spending. In the poorest of the private colleges, a student pays 91 cents on average to get a dollar's worth of educational spending. In the best supported of the public colleges, a student pays less than 8 cents for that dollar! (These numbers emphasize, again, the inconsistency of a public policy that helps a new student with his 8-cent tuition bill while ignoring the 92 cents in additional costs his attendance will impose on the college.[8])

While these issues are still under active investigation—so their analysis may not yet be fully baked—the hierarchy in higher education appears to have, broadly, two kinds of impact on its economics. One is the effect of its position in the hierarchy on an individual college or university; the other is the nature of competition in higher education as it is shaped by the positions of the market participants.

Schools differ markedly in their ability to command student quality input through a donative-wealth-excess-demand-selectivity mechanism (Winston 1999b). They adapt to those quite different circumstances by producing education in very different ways—by using different factor proportions that economize on scarce resources, especially on scarce student quality. Those schools that command a lot of student quality input tend to use it in residential colleges whose living arrangements facilitate student interaction. They are often geographically isolated, have small classes so that the students interact, too, in the classroom, use a non-vocational, "impractical" curriculum, and concentrate on students of compatible "college age." All of these institutional characteristics describe educational production technologies that amplify the effect that high quality students have on each other. With less student quality input, schools shift to a technology with less student interaction—increasing commuter populations, larger classes, wider age diffusion among students, and more vocational curricula. At the extreme are schools producing distance learning via correspondence courses with no student interaction and no contribution of student quality input. As noted above, though, learning may still be organized in ways that amplify student peer effects (Winston, 2000a).

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[6]Berea, significantly, rations its free education by putting a cap on family income—enrollment is limited to those whose families earn less than $60,000.

[7]For instance, in the 1990-91 data used in Winston and Yen (1995).

[8]Lest a reader who remembers his Econ 101 worry about the use of average cost to address what is clearly an issue of marginal cost, in a college that's operating at capacity, the two will be close, if not identical. See note 15 in Winston (1999b).

Table 2.— Subsidies, and Student Quality: 1991

Subsidy Decile	Percent of Applicants Accepted	Mean SAT Score	Percent in top 10% of HS Class	Percent National Merit Semifinalists	Percent with Math SAT 2 of 600	Percent with Verbal SAT 2 of 600	Percent with ACT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
All	**83.2**	**972**	**19.7**	**0.7**	**21.0**	**11.5**	**18.3**
Public only	**88.1**	**939**	**14.6**	**0.3**	**17.0**	**6.7**	**12.1**
Private only	**78.0**	**988**	**22.7**	**1.0**	**22.8**	**13.7**	**22.2**
Decile 1	67.1	1085	37.5	2.7	41.5	27.7	35.5
Decile 2	78.6	997	22.5	0.9	25.1	14.4	22.6
Decile 3	81.6	952	19.2	0.6	19.6	9.1	16.4
Decile 4	85.1	971	18.8	0.6	21.5	9.7	16.9
Decile 5	84.9	955	18.2	0.6	18.6	8.4	18.1
Decile 6	87.1	943	16.5	0.4	15.2	6.9	13.4
Decile 7	86.9	937	16.6	0.4	13.4	7.1	17.6
Decile 8	88.6	934	14.7	0.2	13.3	6.3	12.9
Decile 9	87.1	945	16.5	0.4	14.9	7.0	14.0
Decile 10	84.7	916	12.3	0.2	9.9	5.3	15.6

SOURCE: Gordon C. Winston and Ivan C. Yen, 1995, "Costs, Prices, Subsidies, and Aid in U.S. Higher Education," Discussion Paper No. 32, The Williams Project on the Economics of Higher Education, July, updated; Peterson's Incorporated, Survey of Undergraduate Institutions, reported in Gordon C. Winston, 1999, "Subsidies, Hierarchy and Peers: The Awkward Economics of Higher Education," *Journal of Economics Perspectives*, vol. 13, no. 1 (Winter), pp. 13-36.

Table 2 shows how standard measures of student selectivity differ and are related to alternative educational technologies when arranged according to institutional subsidy deciles. In this table, subsidies were measured using 1991 data, with public and private institutions combined, so they differ slightly from the deciles reported in Table 1. Nonetheless, they show similar patterns of disparity in terms of student selectivity organized by subsidy decile and their educational technology, with the institutions in the highest subsidy deciles able to be the most selective in students accepted in terms of the percentage of applications accepted, mean test scores, and other indicators, and in using technologies appropriate to that selectivity.

The implications of hierarchy for the competition in higher education appear to be quite important, when combined with its other economic characteristics. They are the subject of considerable ongoing study so all I can do here is note what appears to be emerging from that work. Most central seems to be the way a limited national supply of student peer quality—for which colleges and universities compete energetically—combines with the colleges' different ability to provide student subsidies, to create a market in which a college's *position* in the subsidy hierarchy goes far to determine its access to coveted student peer quality. If so, then the competition for

student quality depends on a school's position.[9] That means, simply, that a school's fortunes can change either because of what *it* does or because of what *its competitors* do. That, in turn, has all the characteristics of an arms race. Those characteristics include, most significantly: (a) that it is a race without a finish-line; (b) that an individual school has little choice about whether to compete so long as everyone else is doing it—to opt out is to fall back so individual actors are powerless; (c) in the context of higher education, there is (or has been) a stronger incentive to compete for increased subsidies (cost *minus* price) by spending more to improve quality than by just cutting price; and (d) an even stronger incentive to base the positional competition on fund raising.

If, in answer to another question, open price competition for students and student quality does spread throughout the higher education market, the hierarchical structure—the very different donative resources commanded by different schools—makes the outcome of such competition extremely uncertain. My own recent, and so far best guess (Winston and Zimmerman 2000), is that continued, aggressive price competition will lead to a price structure in which the wealthiest institutions charge the lowest—even negative—tuition prices, removing the protective price umbrella they now hold over the rest of the industry. But one thing seems sure—that a continuation of energetic net price competition through discounting and lowering prices will bring a strikingly different market and, importantly, one that can't safely be predicted on the basis of experience of any existing, for-profit market.

Cost Calculations—Capital Services and Joint Costs

In conclusion, I want to note two important aspects of the *measurement* of college costs that have become apparent in the work we've long been doing to calculate student subsidies.

Most important is that the accounting conventions of higher education (for reasons of considerable interest only to an accounting historian) have neglected the costs of capital services. Conventional college accounting has taken little notice of the costs of using the buildings, equipment, and landscaped grounds in the production of higher education. A careful study of what this means, overall, suggested that in consequence, we typically underestimate the cost of producing higher education by about 25 percent. When capital costs are recognized along with labor costs and those of heating oil and journal subscriptions, estimated costs are increased by that amount (Winston and Lewis 1996). While recent changes in accounting standards have begun to include capital costs—and while efforts like those led by NACUBO to generate methodologies for cost estimation in all of higher education are fully aware of them—it remains that

[9]This is much like the winner-take-all market analyzed by Frank and Cook (1996), but Winston (2000b).

conceptual difficulties will make it impossible, for a few more years at least, to get a full accounting of those costs. The problem is familiar to any teacher of Econ 101 where students find the idea of 'opportunity costs'—the cost involved in using resources that could have been used elsewhere (here, the cost of tying up money in a building that could have been earning a return if it had been put into financial assets, instead)—more than they can get their minds around before the final exam. Unfortunately, board members have the same problem. So it appears that while studies done by economists will usually accommodate the full costs of capital, all we can hope for from other studies is that they include the more obvious depreciation costs of capital and, maybe, be aware of what they're leaving out. (Depreciation is on the order of 2.5 percent of replacement value while opportunity cost is, conservatively, 8 percent or more.)

Joint costs arise when firms do more than one thing—produce more than one product. And, of course, complicated universities do that with their undergraduate and graduate education and faculty research, TV entertainment through varsity sports, hotel and dining services, and health care. The job of separating out the *part* of all that economic activity relevant to undergraduate education—the costs and revenues it accounts for—is formidable. A template of sorts for undergraduate educational costs exists in the simple, one-product liberal arts colleges—a template against which estimates of relevant undergraduate costs from universities can be compared—but real precision in attribution of costs to undergraduate education will remain elusive since there aren't any 'right' answers.[10]

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[10]In the work I've done on national IPEDS data, this has been addressed (To 1987) by identifying direct costs incurred by the educational function and those direct costs deemed irrelevant to education so that the joint costs of functions that serve them both can be allocated in proportion to the use of the direct costs. This seems to be a crude but defensible procedure.

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